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SYLLABUS

OF

A COURSE

OF

CHEMICAL LECTURES,

READ AT

GUY'S HOSPITAL.

BY

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PREFACE.

In every Science taught by lectures, a Syllabus of the Courſe has been found uſeful to the ſtudent. He is thereby furniſhed with a conciſe ſtatement of the ſeveral diviſions of the ſubject, and of its general arrangement. He is ſupplied with definitions of ſcientific terms, and is enabled to connect, and retain with facility, the information he receives.

The objects of Chemiſtry being various, its views extenſive, its principles of union as a ſcience, ſubtle, and its inveſtigations minute, the aid of ſuch a ſynopſis was as neceſſary to it as to any other branch of Natural Philoſophy. Modern improvements as they have enlarged the ſcope of this ſcience, have added to the uſes of a proſpectus to explain it. The diſcoveries which have been recently made are ſo various and important, the Nomenclature has undergone, within theſe few years, ſuch a complete and eſſential change, that the Chemiſtry of the preſent day may be not improperly conſidered—as a new ſcience expreſſed in a new language.

It is on theſe grounds, that the author has thought it his duty to draw up the following Syllabus of the lectures which he reads at Guy's Hoſpital.

As his courſe is neceſſarily deſigned for Medical Students, he has beſtowed particular attention on thoſe parts which relate to their profeſſion. He has not, however, by any means confined his views to this object alone, knowing that there is ſcarcely a ſcience or an art, ſcarcely a manufacture or an occupation, in which an acquaintance with chemical reſearch is not productive of advantage; that although the ſcholar, the artiſt, and the gentleman, may approach it with different views, each will obtain information more than ſufficient to reward him for the purſuit.

The author has, on this account, endeavoured to arrange the elementary principles of the ſcience, ſo as to render them applicable not only to medical purpoſes, but to every other to which Chemiſtry is adapted; and in doing thus much, he is not without hope, that, independent of preſent advantage, he ſhall have made himſelf uſeful to his pupils when they have ceaſed to attend him; that by future peruſals of this Syllabus, they may recall ſome valuable information which length of time or diverſity of employment had eraſed from their memories; that it may ſerve as a general outline of the ſcience, which they may fill up at their leiſure,—as a ſyſtematic arrangement, to which they may refer whatever they can learn of others or diſcover of themſelves.

Although the ſyſtems of the older chemiſts are now exploded, and many of their principles ſhewn to be fallacious, their works are ſtill acknowledged to contain valuable ſources of information. But as the ancient Nomenclature differs ſo eſſentially from the modern, the young ſtudent often finds the meaning of theſe authors involved in conſiderable obſcurity. To obviate this difficulty as much as poſſible for the learner, tables are ſubjoined after the manner of the *Tabl. de la Nomenclat. Chim. propoſ. par M. M. Morveau Lavoiſier*, &c. in which the old

old and new names of chemical ſubſtances are ſo claſſed, as to be brought under the eye, and compared at one view; and as ſome pains have been taken to render theſe tables at once copious and correct, it is hoped that they will, on moſt occaſions, be found to anſwer their intended purpoſe.

The properties of Light, ſo far as it is fit to conſider them in a chemical point of view, are comprehended under the head of the opinions regarding Caloric.

SYLLABUS OF CHEMISTRY.

INTRODUCTION.

OF the properties of *Matter*, the ſubject of experimental philoſophy in general.

Theſe either common to all bodies, as *Extenſion*, *Impenetrability*, *Diviſibility*, *Weight*; or proper to particular bodies, as *Colour*, *Figure*, *Texture*, *Solubility*, &c.

From the conſideration of the peculiar properties of *Matter* ariſes its diſtribution into different *Kinds*; and from the action of *theſe* upon each other, the various *Combinations* and *Decompoſitions* which conſtitute the province of CHEMISTRY.

CHEMISTRY therefore defined, *The Science of the Compoſition and Decompoſition of the heterogeneous particles of Matter.*

Of the diſtinction between this, and other branches of natural knowledge, more eſpecially *Natural Hiſtory* and *Natural Philoſophy.*

What is generally underſtood by the *Vis Inertiæ* of matter.

Of the *Motion* of bodies, as communicated to them by *external Impulſe*, or excited in them by their diſpoſition to *attract*, or *repel* each other.

Of the different ſpecies of *Attraction* which originate from this diſpoſition, viz. of *Magnetiſm*—of *Electricity*—*Capillary Attraction*—*Attraction of Gravitation*—*Attraction of Coheſion* and *Chemical Attraction.*

OF CHEMICAL ATTRACTION.

This found to operate excluſively between ſuch particles of matter as are *diſſimilar*, or *heterogeneous.*

It takes place amongſt the *more minute Particles* of matter, and at *inſenſible Diſtances.*

It requires that theſe ſhould poſſeſs a certain degree of *Fluidity.*

It

It produces in their properties very remarkable changes, of *Temperature*, *Specific Gravity*, *Texture*, *Colour*, *Taſte*, *Smell*, &c. ſo that the properties of the compound can ſeldom be deduced from thoſe of its component parts.

This attraction exerts itſelf between different bodies with different degrees of *Force*; hence the important doctrine of *Chemical Affinity*.

Of the conſtruction of tables of *Simple* and *Compound Affinity*, called alſo tables of *Single* and *Double Elective Attraction*.

Of *Saturation*, or the limitation to the proportions in which certain bodies *chemically* unite.

Of the means by which the power of *Chemical Attraction* may be increaſed or diminiſhed.

The influence of *Heat* on it more eſpecially remarkable.

OF CALORIC.

How the terms *Caloric*, *Matter of Heat* or *Fire*, *Temperature*, &c. are philoſophically to be underſtood.

Of the various opinions which have been entertained with regard to the nature of *Caloric.*

It exiſts either in a *looſe* ſtate, producing in different bodies *Warmth*, *Expanſion*, *Fluidity*, *Volatility*, &c. in proportion to its quantity; or in a ſtate of *Combination* in which its properties ceaſe to be evident; in the one caſe called *ſenſible*, in the other *latent.*

Caloric in a *ſenſible* or *looſe* ſtate has a tendency to diffuſe itſelf among contiguous ſubſtances, ſo as to maintain an uniformity of temperature.

It paſſes from one body to another with more or leſs celerity according to its intenſity. *Denſe* bodies alſo tranſmit it more readily, than *rare*; hence the diſtinction between more or leſs perfect *Conductors* of *Caloric.*

In *fluid* bodies it keeps up a perpetual circulation of their particles.

Equal quantities of *Caloric* produce unequal temperatures in equal quantities of diſſimilar ſubſtances. Bodies therefore ſaid to have different *Capacities* for *Caloric*, or to differ in their *ſpecific* or *comparative Heats.*

A variation in the *Temperature* of bodies univerſally accompanied by a variation in their *Bulk.*

In ſome the dilatation and contraction appear to correſpond with the quantity of *Caloric* by which they are occaſioned. Hence the conſtruction of the *Thermometer.*

Of the precautions to be obſerved in the application of this uſeful inſtrument.

Of the *Liquefaction*, *Melting*, or *Fuſion* of bodies.

Of their *Volatilization*, or converſion into vapour by *Caloric.*

In this ſtate they poſſeſs a high degree of *Elaſticity.* Upon the expanſive power of volatized water depends the effects of the *Steam Engine.*

To the head of *Evaporation* may alſo be referred the proceſſes of *Diſtillation*, and *Sublimation.*

By accumulated *Caloric* bodies may be either rendered *luminous*, without ſuffering any other eſſential change; or they may be entirely altered in their properties, producing at the ſame time *Light* and *Heat.*—In the one caſe they are ſaid to be *ignited*, in the other *inflamed.* Hence the diſtinction between *combuſtible* and *incombuſtible* ſubſtances.

The *Inflammation*, or *Combuſtion* of bodies takes place only when they are expoſed to *Air*. The ſubjects of *Caloric* and *Air* therefore naturally connected.

OF ATMOSPHERICAL OR COMMON AIR.

Of the *Weight*, *Elaſticity*, and other general properties of this fluid.

Subject to various changes from viciſſitude of temperature and other accidental cauſes.

Of the *chemical* properties of the inferior ſtratum of the *Atmoſphere*.

Shewn both by *Analyſis* and *Syntheſis* to be compoſed of two parts.

One by which *Reſpiration* and *Combuſtion* can alone be ſupported, *Oxygen Gas*.

The other in which both *Life* and *Flame* are immediately extinguiſhed, *Azotic*, or *Nitrogen Gas*.

Of Oxygen Gas.

Obtained in a ſeparate ſtate from *metallic Oxyds* and compounds of the *Nitric* and other acids by the application of heat.

Its purity aſcertained by mixture with *Nitrous Gas. Eudiometer.*

Somewhat heavier than *Common Air.*

Is abſorbed by many bodies upon ſimple expoſure, as in *Fermentation*, *Bleaching*, &c.

Serves the purpoſes of *Reſpiration* and *Combuſtion* in an eminent degree.

In *Reſpiration* is diminiſhed in bulk, and produces *Carbonic Acid Gas*; hence the function of the *Lungs* and origin of *Animal Heat.*

By combuſtion with *Hydrogen Gas* (ſo named from this property) it forms *Water.*

In the combuſtion of many other bodies, as *Sulphur*, *Phoſphorus*, *Charcoal*, &c. whilſt *Heat* and *Light* are given out, it communicates to them the properties of *Acids*. The gas itſelf diſappears, but produces in the acid *Reſidua* an increaſe of weight proportional to the quantity conſumed;

conſumed; hence the modern theories of *Combuſtion* and *Acidification*, as depending on the decompoſition of *Oxygen Gas* and the conſequent union of its *Baſe* with the ſubſtances employed to effect it; and hence the terms *Oxygen* and *Oxygenation*.

Metals by combuſtion approach to an acid ſtate, to which ſome may be brought by a further acceſſion of *Oxygen*; hence the terms *Oxyd* and *Oxydation*.

Of Azotic Gas.

Remains after the abſtraction of *Oxygen Gas* from *Atmoſpherical Air* on its expoſure to *Sulphuret of Potaſh*, a mixture of *Iron Filings* and *Sulphur*, &c.

Obtained in its pureſt ſtate from a mixture of *Oxy-muriatic acid* and *Ammoniacal* gaſſes.

Lighter than *Atmoſpherical Air*.

Noxious to *Life* and *Flame*, but not to *Vegetation*.

Forms a conſtituent part of *Animal Matter*.

More particularly characteriſed by the production of *Nitrous Acid* on its union with *Oxygen*, and of *Ammoniac* with *Hydrogen.* From the former of theſe properties obtains the name *Nitrogen.*

Of the means employed by nature to maintain a due proportion between this and *Oxygen Gas* in the compoſition of the *Atmoſphere*,

OF WATER.

The *phyſical* properties of *Water* differ in the *ſolid*, *liquid*, and *gaſſeous* or *vaporous* ſtates of aggregation, which depend upon the influence of *Caloric.*

In its paſſage from the *liquid* to the *ſolid* ſtate of aggregation, there takes place an increaſe of *Temperature*, an extrication of *Air*, or other extraneous matter previouſly contained, a peculiar arrangement of *Particles*, and a conſequent augmentation of *Bulk.*

The *Expanſion* of *Water* in the act of *Congela-*

tion exerts itſelf with irreſiſtible force; hence the beneficial effects of froſt on ſome occaſions and its inconveniences on others.

Water in the liquid ſtate to a certain degree *compreſſible.*

Poſſeſſes in this ſtate a *ſolvent* power over moſt other bodies, ſeldom therefore free from impregnation.

It enters into many bodies as a *conſtituent* part.

The temperature at which it paſſes to the ſtate of vapour proportional, as in all other *Liquids*, to the degree of preſſure made upon its ſurface, as ſeen in the application of *Papin's Digeſter.*

The *Vapour* of *Water* highly *elaſtic*; hence, as already mentioned, the conſtruction of *Steam Engines.*

By the *Vapour* of *Water* the combuſtion of many bodies is accelerated. When applied to heated *Iron*, *Zinc*, and other metals, it converts them into *Oxyds*, yielding at the ſame time *Hydrogen Gas*, which produces *Water* in combuſtion with *Oxygen Gas*, as before ſtated.

Water therefore no longer conſidered as an *Element*, but compounded of the *Baſes* of theſe two fluids.

Of Hydrogen Gas, or Inflammable Air.

Found in a diſengaged ſtate in *Coal Mines*, on the ſurface of *Stagnant Waters*, and riſing through the waters of certain *Springs*.

Obtained alſo artificially from the diſtillation of *animal*, *vegetable*, and *bituminous* matter; from the application of heat to *Eſſential Oils*, *Alcohol*, *Æthers*, &c. and from pure *Ammoniac* by means the *Electric Spark*.

Pureſt from the decompoſition of *Water* by *Metals* as above ſtated, or during their ſolution in *diluted Acids*.

When pure many times lighter than *Atmoſpherical Air*; hence the conſtruction of *Aeroſtatic Machines*.

Smell adventitious.

On inſpiration proves noxious to *Animal Life*, apparently by the excluſion of the *reſpirable* part of the *Atmoſphere*; hence its late application in the treatment of certain diſeaſes, ariſing as it has been thought, from exceſs of *Oxygen* in the ſyſtem.

Burns only when in contact with *Oxygen Gas.* The *Slowneſs* or *Rapidity* of the combuſtion depends on the proportions, and intimacy of the previous Mixture.

On all occaſions *Water* is the conſequence.

The extrication of *Oxygen Gas* from vegetables growing under the influence of light depends, according to the general opinion, on the decompoſition of *Water*, the *Hydrogen* of which is abſorbed.

Hydrogen and *Nitrogen Gaſſes* by their union compoſe *Ammoniac.*

Of Acids.

Diſtinguiſhed by being *ſour* to the taſte, changing vegetable *blue* colours to *red*, and by their extenſive power of combining with other ſubſtances.

All unite readily with *Water.*

In

In combination with *Alkalis* form for the moſt part what are called *Neutral Salts*; with *Earths* and *Metallic Oxyds*, *earthy* and *metallic Salts*.

Moſt of the acids *antiſeptic*. Some powerfully *corroſive*.

Conſiſt of *Inflammable Subſtances* united to the baſe of *Oxygen Gas*, the proportion of which determines the degree of *acidity*.

Uſually divided into *mineral*, *vegetable*, and *animal*, according to the ſources from whence they are moſt abundantly obtained.

The *mineral Acids* are the *Sulphuric*, *Nitric*, *Muriatic*, *Carbonic*, *Fluoric*, *Boracic*, *Succinic*, *Arſenic*, *Tungſtenic*, and *Molybdenic*.

Of the Sulphuric or *Vitriolic Acid.*

Obtained from the burning of *Sulphur*, and diſtillation of *Sulphate* of *Iron*.

Concentrated afterwards by *boiling*.

When pure, *limpid*, *ponderous*, *unctuous*, *inodorous* and intenſely *ſour*.

Has a powerful attraction for *Moiſture*, and on mixture with *Water* occaſions an increaſe of temperature.

Freezes moſt eaſily when concentrated.

Unites intimately with *Alkalis*, producing with the vegetable, *Sulphate* of *Potaſh* (*Kali Vitriolatum* P. L.), with the mineral, *Sulphate* of *Soda* (*Natron Vitriolatum* P. L.), and with the volatile, *Sulphate* of *Ammoniac.*

With the *Earths*, *Sulphate* of *Baryt*, of *Lime*, of *Magneſia* (*Magneſia Vitriolata* P. L.), &c.

With *Metals*, *Sulphate* of *Zinc* (*Zincum Vitriolatum* P. L.), *Sulphate* of *Copper* (*Cuprum Vitriolatum* P. L.), &c.

May be deprived of a portion of its *Oxygen* by treatment with *Inflammable Subſtances* converting it into *Sulphureous acid Gas*, or totally decompoſed and reduced to the form of *Sulphur.*

The properties of *Sulphureous acid Gas* in many reſpects different from thoſe of *Sulphuric Acid.* Its compounds therefore denominated *Sulphites.*

The *Sulphuric Acid* ſuperior to moſt others in reſpect to its *Power* of *Attraction.*

The *order* of its *Attraction* is *Baryt*, *Potaſh*, *Soda*, *Lime*, *Magneſia*, *Ammoniac*, *Alumine*, *Metallic Oxyds*, *Water*, *Spirit*.

Employed principally in *Dying*, *Bleaching*, *Tanning*, *Purification* of *Oils*, and in *Medicine*.

Of Nitric Acid.

Obtained from the decompoſition of *Nitrate* of *Potaſh* by *Sulphuric Acid*, by de-aqueated *Sulphate of Iron*, or *Alumine*.

Purified by re-diſtilling from a freſh portion of *Nitre*, or by the addition of *Nitrate of Silver*.

In its common form, of a *yellowiſh* or *orange* colour. When pure, altogether *colourleſs*.

More *volatile* and leſs *ponderous* than *Sulphuric Acid*. Its *Acidity* equally intenſe.

Attracts *Moiſture* alſo from the atmoſphere, and unites readily with *Water*; but produces with it a leſs degree of *Heat*.

Deſtructive more immediately than the *Sulphuric Acid* of the life and texture of bodies to which it is applied.

By

By union with *Sulphuric Acid* acquires new properties, *Aqua Regina.*

By its union with the *Alkalis* produces *Nitrate of Potaſh* (*Nitrum* P. L.) *Nitrate of Soda, Nitrate of Ammoniac.*

With *Earths, Nitrate of Baryt, Nitrate of Lime, &c.*

With *Metals, Nitrate of Zinc, Nitrate of Iron, &c.*

In diſſolving *Metals*, is partially decompoſed and converted into *Nitrous Gas*, which on mixture with *Oxygen Gas*, reproduces *Nitric Acid*, and has many other remarkable properties.

Many of the *Inflammable Subſtances* produce a ſimilar effect.

Some decompoſe it more completely; and by the ſeparation of its *Oxygen* occaſion actual *Inflammation.*

Decompoſed alſo by expoſure to *Light*, as well as by the application of *Heat*. The product *Oxygen Gas*, with a certain admixture of *Azotic Gas*. Theſe therefore conſidered as the elements of *Nitric Acid.*

By different modes of combination they may be made to reproduce it.

The

The *order* of *attraction* of this acid the ſame as that of the *Sulphuric.*

Chief uſes in *Dying, Etching,* and *Aſſaying*; and ſometimes, though rarely, in *Medicine.*

Of Muriatic Acid.

Obtained by decompoſing *Muriate* of *Soda* (common or ſea ſalt) by means ſimilar to thoſe employed in the preparation of *Nitric Acid.*

Form *gaſſeous.*

In this ſtate is readily abſorbed by water, increaſing both its temperature and bulk, and communicating to it the general properties of an *Acid* (*Acidum Muriaticum,* P. L.).

In union with *Alkalis* forms *Muriate* of *Potaſh*; *Muriate* of *Soda* (*Sal Muriaticus,* P. L.) and *Muriate* of *Ammoniac* (*Sal Ammoniacus,* P. L.).

With *Earths, Muriate* of *Baryt,* of *Lime,* &c.

With *Metals, Muriate* of *Zinc,* of *Iron,* &c.

With ſome of the *Metals,* as *Zinc* and *Iron,* and ſome of the *Inflammable Subſtances,* as *Alcohol, Eſſential Oils, Phoſphorus,* &c. it produces *Hydrogen Gas.*

On diſtillation from certain *metallic Oxyds*, it unites with their *Oxygen*, and acquires thereby a ſingular alteration in its properties. *Oxy-muriatic Acid*, *Aqua regia.*

Remarkable in this form for its effects on animal and vegetable colours; hence its preſent application in *Bleaching.*

The affinity of *Muriatic Acid* in moſt inſtances weaker than that of either the *Sulphuric* or *Nitric*; but the order of its attraction the ſame.

Baſis as yet unknown.

Employed principally in *Medicine*, *Bleaching*, *Dying*, and *Aſſaying*.

Of Carbonic Acid.

Sources of this *Acid* various.

Uſually collected from bodies undergoing the *vinous Fermentation*; or from *Carbonated Earths* or *Alkalis*, by the application of *Heat*, or more commonly by the addition of an *Acid* of ſuperior attraction.

Specifically *heavier* than atmoſpherical air, nearly as 2 to 1.

In

In a high degree noxious, when employed alone in *Reſpiration.*

Equally unfavourable to the proceſs of *Combuſtion.*

Unites readily with *Water*, communicating to it *acid* properties, and a conſequent ſolvent power over other bodies; hence the nature and imitation of various *medicinal Springs.*

Renders *Alkalis* capable of cryſtallization. In union with *Potaſh* forms *Carbonate* of *Potaſh* (*Kali Præparatum* P. L.); with *Soda*, *Carbonate* of *Soda* (*Natron Præparatum*, P. L.); and with *Ammoniac*, *Carbonate* of *Ammoniac* (*Ammonia præparata* P. L.)

With *Earths*, *Carbonate* of *Baryt*, of *Lime*, &c.

With *Metals*, *Carbonate* of *Zinc*, &c.

Has for its baſe *Carbon*, which by combining with *Oxygen*, uniformly produces it, and which it has been found to yield upon being decompoſed.

Inferior to moſt of the *Acids* in its *Attraction* for other bodies.

Order of Attraction, *Baryt*, *Lime*, *Potaſh*, *Soda*, *Magneſia*, *Ammoniac*, *Alumine*, *metallic Oxyds*, *Water*, *Spirit*. Uſes chiefly *medical.*

Of Fluoric Acid.

Obtained by decompoſing *Fluate* of *Lime* by means of the *Sulphuric Acid.*

Form *gaſſeous.*

Heavier than atmoſpherical air, as 1.5 to 1. *Cauſtic.*—*Azotic.*

Unites readily with *Water*, and renders it intenſely ſour.

In union with the *Alkalis*, forms compounds of a gelatinous conſiſtence.

Poſſeſſes the remarkable property of diſſolving and volatilizing *Silex.*

Diſſolves *Zinc*, *Iron*, and *Copper*; the other metals not acted on, unleſs in the ſtate of *Oxyds.*

Baſis unknown.

Order of Attraction, *Lime*, *Baryt*, *Magneſia*, *Potaſh*, *Soda*, *Ammoniac*, *Alumine*, *metallic Oxyds*, *Water*, *Spirit.*

Uſe—*Etching on Glaſs.*

Fluoric acid is a pure acid, more powerful
its gaseous state, is found in great abun-
ance in many parts of this country, combin-
with mineral substances, it is unlike
arble or the earths, because is in union with
lphuric acid, it does not effervesce or give
t heat & requires the external applica-
ion of heat to produce decomposition & in
tillation is completely Aeriform, this
id Gas in contact with water becomes gelati-
ous, which substance is altogether com-
sed of flinty earth & it is therefore a
ompound of this acid & Water, but if it
distilled in a metallic vessel instead
e a Glass one, no such gelatinous sub-
tance appears, it is elastic. It may
obtained by pouring by pouring sul-
huric acid on fluor or the fluate of
ime & distilling them. Fluor is uni-
ormly cubical when chrystalized & is
ere-fore called Cubic fluor, & is found in
northern counties of England, espe-
ally in Cornwall. It is a compound of
ime & acid of fluor. The gas of this

substance completely destroys flinty earth, therefore w^d completely destroys Glass vessel in a thousand holes. If the surface of Glass be defended with proper varnish it may be etched or beautifully by applying this acid, out with a common engraving instrument & glass is ornamen in this way. This gas is totally unfit for respiration of animals. The fluates of Lime however are found in different states of aggregation. This then is the only acid capable of making any impression on Gl except the white acid of arsenic which do it slightly

The Boracic Acid is that scaly salt first obtained from the decomposition of Borax & diluted sulphuric acid, whic was formerly called the sedative salt of Homberg, Borax is a compound of mineral Alkali & acid of Borax. It changes Vegetable Blue to Green. It easily vitrifies by heat & powerfully promotes the vitrification of other bo but it is not durable; it is used as Sodder instead of common Borax which fluxes the metallic oxyd

Of Boracic Acid.

Found in ſolution in the water of certain *Lakes*; or obtained artificially, by decompoſing *Borate* of *Soda* by *Sulphuric Acid*; or by ſublimation with *Sulphate* of *Iron.*

Form *concrete, ſcaly*; *Semi-tranſparent*, and of a *pearly luſtre.*

Sparingly ſoluble in *Water*; more ſo in *Alcohol*, to the flame of which it comunicates a greeniſh tinge.

When united with *Water* eaſily ſublimed.

Fuſible without addition into a tranſparent *Glaſs.*

Forms, with *Potaſh, Borate* of *Potaſh*; with *Soda, Borate* of *Soda (Common Borax)*; &c.

With *Lime, Borate* of *Lime*, &c.

Baſis unknown.

Order of Attraction, *Lime, Baryt, Magneſia, Potaſh, Soda, Ammoniac, Alumine, metallic Oxyds, Water, Spirit.*

Suppoſed by the diſcoverer Homberg to poſſeſs peculiar *ſedative* powers, and hence called by him *ſedative ſalt.*

Of Succinic Acid.

Obtained from *Amber* by diſtillation without addition.

Freed from *Empyreumatic Oil,* and rendered colourleſs, by rediſtillation; by ſolution and filtration; by ſolution in muriatic acid; or, by detonation with *Nitre.*

Readily ſoluble in *cold Water,* ſtill more ſo in *boiling Water* or in *Spirit.*

Form *concrete,* conſiſting of minute triangular priſms, truncated at their apices.

Unites with the *Alkalis, Earths,* and *metallic Oxyds,* forming with them compounds, the properties of which have as yet been little enquired into.

Baſis not aſcertained.

Order of attraction—*Baryt, Lime, Magneſia, Potaſh, Soda, Ammoniac, Alumine, metallic Oxyds, Water, Spirit.*

Uſe confined to medicine.

Succinic acid

If amber be distilled in a retort, volatile Alkali, inflammable gas & a concrete of brown Sugary form are given out, & the latter when repeatedly washed forms the Salt of Amber or the Succinic acid. This Acid is soluble in Water at the common Temperature of Water.

Arsenic Acid

If the white oxyd of Arsenic be mix'd with muriatic acid & then with repeated quantities of nitric gas & the application of heat, at length the oxyd is hyperoxygenated & is now more soluble in water, more sapid to the taste, changes vegetable blue to red, with other properties of acids. The Regulus & the white calx or oxyd of Arsenic & the acid are the common forms of the Arsenic, only differing in proportion to the oxygenous or acidifying principle.

Of Arſenic Acid.

Obtained by the acidification of common *Oxyd* of *Arſenic* by treatment with the *Nitric* or *Oxy-muriatic Acid*; *Nitrate* of *Ammoniac*; or other ſubſtances capable of furniſhing *Oxygen.*

Form *concrete.*

Pretty readily ſoluble in *Water.* Melts into a tranſparent *Glaſs,* which on cooling becomes opake.

By the continued application of heat may be reduced into the form of *Oxyd.*

Combines with the *Alkalis* in certain proportions, and forms with them cryſtalliſable ſalts. *Arſeniate* of *Potaſh (Macquer's Arſenical Salt),* &c.

Combines alſo with moſt of the *Earths.*

Acts on ſeveral *Metals,* as *Zinc,* and *Iron*; and enters into union with moſt of the metallic *Oxyds. Arſeniate of Copper (Scheele's green Pigment)*; &c.

In the dry way decompoſes many of the compound ſalts, as *Sulphate* of *Potaſh,* of *Soda,* &c.

By diſtillation with *Charcoal,* or digeſtion with *Turpentine*, *Expreſſed Oils*, or *Sugar*, may be completely deprived of its *Oxygen*, and reduced to a *Regulus*.

Unites readily with *Sulphur*.

Order of Attraction, *Lime, Baryt, Magneſia, Potaſh, Soda, Ammoniac, Alumine, metallic Oxyds, Water, Spirit.*

Medical properties nearly the ſame as thoſe of the *white Oxyd*, or common arſenic.

Of Tungſtic Acid.

Obtained from the mineral ſubſtances *Tungſten* and *Wolfram*, by fuſion with *Carbonate* of *Potaſh*, ſolution in *Water*, and addition of *Nitric Acid*; or by alternate digeſtion in *Nitric* or *Muriatic Acid*, and *Ammoniac*, and ſubſequent application of heat.

Form *pulverulent*.—Colour *yellow*. Specific gravity 6, 12.—*Inſipid*.—*Inſoluble*.

Infuſible per ſe, but with *Phoſphate* of *Soda*, and *Ammoniac*, forms a blue, and with *Borate* of *Soda*, a browniſh-yellow glaſs.

Not

Not acted upon by other acids.

With *Potaſh*, and *Ammoniac*, forms ſalts with exceſs of Alkali, convertible into triple compounds by the addition of the *Nitric* or *Muriatic Acid (Tungſtenic Acid* of *Scheele)*.

With *Baryt*, *Lime*, and *Magneſia*, ſalts of difficult ſolubility.

Unites with moſt of the *Metals*, under the application of the higher degrees of heat.

Unites alſo with *Sulphur* into a friable maſs.

May be reduced to a *Regulus*, by being heated with *Charcoal*; this peculiar metal therefore to be conſidered as its baſis.

Order of attraction, *Lime*, *Baryt*, *Magneſia*, *Potaſh*, *Soda*, *Ammoniac*, *Alumine*, *metallic Oxyds*, *Water*, *Spirit*.

Of Molybdic Acid.

Obtained from the mineral ſubſtance *Molybdena (Sulphuret* of *Molybdena)* by treatment with *Arſenic Acid*; or *Nitric Acid* diluted; or by deflagration with *Nitrate* of *Potaſh*, ſolution in water, and addition of diluted *Sulphuric Acid*.

Form,

Form, *pulverulent.*—Colour *white.*—Taſte *metallic.*—Specific gravity 3, 46.

Of little ſolubility in *Water*, more ſoluble in *Sulphuric Acid*, ſtill more ſo in the *Muriatic*; the two laſt of which on cooling acquire a blue colour.

Sublimes into white flowers under the joint application of *Heat* and *Air*.

Unites with *Potaſh*, and forms a ſalt, cryſtalliſable by evaporation—With *Ammoniac* one which parts with its alkali in a gentle heat.

With *Baryt*, *Lime*, and *Magneſia*, ſalts ſparingly ſoluble in water.

Diſſolves ſeveral *Metals*. By fuſion with ſome of them, as *Iron*, *Copper*, and *Silver*, forms friable compounds. Alſo precipitates ſeveral of the metallic ſolutions, as *Nitrate of Silver*, *Quickſilver*, &c.

In the dry way, decompoſes ſeveral of the *Neutral ſalts*.

By union with *Sulphur* it regenerates *Molybdena*.

May be metallized by mixture with *Oil*, and application of an intenſe degree of *Heat*.

Order of attraction not yet aſcertained.

Acetic Acid or Vinegar

is the result of the spontaneous fermentation process on certain vegetable & animal matter. There is no vinous liquor whch when diluted, exposed to air of a certain temperature & agitated but has a strong disposition to contract acid properties. Many, especially vegetable substances become sour without giving out any vinous or spirituous matter, some on the contrary produce better acid & in greater quantity in proportion as it contains more spirit, the stronger the liquor the better is the acid; a certain quantity of spirit checking the acetous process, but at length increases the sourity of the acid. All fermented liquors then are apt to become acetous by a change of circumstances. Common vinegar retains still a certain quantity of spirit, than a certain quantity of mucilage with oily matter, some colour with a

superabundance of water which are al
to be removed by distillation in glass Ve
-sels, the first which is given over is to
be rejected, because the water is more
volatile than the Acetic, the latter part
also becoming empyreumatic is to be
rejected it is thus rendered colourless & tra
-sparent if kept from the contact of the
or otherwise will run into the Putrefacti
state: If the Vinegar be put into Bottles
& these be placed in the hot water bath till
has acquired as much heat as it can bear,
it will keep for many years. Moderate c
-gelation gives an opportunity of removing
water from the Acid without at all dec
-omposing it, but it is still much more con
-centrated by combining it with earthy or alk
-line matter, freeing it thereby of its w
by forming a Salt which being mixed wit
the smallest quantity of sulphuric ac
the acetic acid is evolved in great plenty &
purity in a gaseous form & this is
radical form of vinegar, which is called
Acetic acid in contradistinction to the
-cetous or common vinegar, nor does it

The *Vegetable Acids* are, the *Acetic*, *Tartareous*, *Pyro-tartareous*, *Oxalic*, *Gallic*, *Citric*, *Malic*, *Benzoic*, *Pyro-ligneous*, *Pyro-mucous*, and *Camphoric.*

Of Acetic Acid.

Obtained by the ſimple diſtillation of *Acetite of Copper* (*Acidum Acetoſum* P. L.), or by decompoſing *Acetite* of *Potaſh* by the *Sulphuric Acid.*

Form, *liquid—Colourleſs.*

Contains a larger proportion of *Oxygen* than the *Acetous Acid* or vinegar, and therefore of greater acidity.

Of the preparation of the *Acetous Acid* from different vinous liquors, and the circumſtances which more eſpecially promote it.

The *Colour*, *Acidity*, and other properties of this, depend chiefly on the material from which it is obtained. Uſually of a ſharp ſour taſte, and ſpirituous acid odour.

By keeping loſes its *acidity*, becoming thick and putrid. The *Heat* of *boiling Water* counteracts theſe changes.

Moſt conveniently *purified* by cautious diſtillation in veſſels of glaſs.

The higher degrees of heat decompoſe it.

May be *concentrated* by freezing.

Forms with *Potaſh*, *Acetite of Potaſh* (*Kali Acetatum* P. L.), with *Ammoniac*, *Acetite of Ammoniac* (*Aqua Ammoniæ Acetatæ* P. L.).

Diſſolves moſt of the *Earths*.

Diſſolves alſo moſt of the *metallic Oxyds*, producing with *Lead*, *Acetite of Lead* (*Ceruſſa acetata* P. L.); with *Copper*, *Acetite of Copper* (*Aerugo* P. L.), with *Quickſilver*, in the *acetic* form, *Acetate of Quickſilver* (*Hydrargyrus Acetatus* P. L.).

Gums, *Gum-reſins*, vegetable eſſential *Salts* and *Extracts* ſoluble in *acetous Acid*; hence its extenſive application in pharmacy.

Appears to be a compound of *Carbon* and *Hydrogen* in union with *Oxygen*.

Order of Attraction, *Baryt*, *Potaſh*, *Soda*, *Ammoniac*, *Lime*, *Magneſia*, *Alumine*, *metallic Oxyds*, *Water*, *Spirit*.

Employed in the arts, as in *Dying* and *Printing*, and alſo extenſively for *dietetic* and *medical* purpoſes.

lution alone account for the difference as the former has more oxygen. The acetic acid is employed for purifying sick rooms; it is otherwise also unlike common vinegar is more pungent producing different compounds & the difference is that from heat of the sulphuric acid, this is decomposed & gives it oxygen to the other acid; but it is probable that the only difference between the acetic & the acetous acid consists in the disparity of the oxygen. The Acidum Acetosum is procured fr. the distillation of verdigris & sulphuric acid & is called Thieves vinegar, but if it is made according to the London Pharm. it may be contaminated with oxyd of copper so as soon to make it green & very pernicious; & requires redistillation if this be suspected, it is better therefore to make it by pouring sulphuric acid on the Kali acetatum in a retort & distilling it & it may be used to impregnate rooms by placing a lamp, simply under it the cup. — Sp.t of Wine has a strong disposi=

-tion to check fermentation suddenly at, & goes on very slowly afterwards & we alwa obtain a larger proportion of alcohol. White Wine is generally stronger than other com Wine, hence it produces a stronger vine Fermented liquors should be kept in vessels which should be inverted or placed o their side, so as to give an opportunity f. any inflammable fluid which may be generated to escape by its levity by the cork The Vegetable fermented acid is of al others the most important & Sp.t the Water & Vinegar are the 3 great menstrua in Pharmacy-

Of Tartareous Acid

This acid is procured from tartrite of
otash or chrystals of tarter by the addit-
n of lime or Chalk & sulphuric acid di-
luted, the former being dissolved in Water,
d this acid explains the chrystals of tartar,
its acidity depending on the attached particular
cid. If the superabundant acid be satu-
rated with fixed Alkali then soluble tartar
is formed which is a neutral & more so-
luble salt, carbonic acid being evolved by the
effervescence because it contains no carbo-
nic acid gas without producing any so-
luble tartar, this decomposing the whole
of the Cream of tartar, the chalk produc-
ing only partial decomposition to this
dilute sulphuric acid is to be added, w^ch
produces a quantity of Selenite or gypsum
which is insoluble & in an acid of lime
the liquor is to be passed thro paper, & is
to be evaporated till a pellicle appears on
the surface, allowing it then to cool & the
soluble tartar chrystalizes, it differs only

in the proportion of the Acid. In the Swe-
-ish Pharmacopoeia it is used instead of the
Chrystals of tartar because more agreeab
If it be distilled it produces an acid of a
particular empyreumatic taste called
Pyro-tartaric-acid. If instead of Carbon
Lime the tartarised lime is then in gre-
-er quantity, because a larger quanti
of the acid is produced here by single as.
by double elective attraction, the lime i
already in union with the carbonic aci
gas, but the acid of tartar has a grea
attraction for lime than the carbonic
acid Gas; but if lime be added in suff-
-cient quantity the chrystals of tartar
wholly decompose it; or if to a solutio
of Natron tartarisatum you add either
the sulphuric acid, you have a turb
mixture containing salt, of properti
analogous to those of chrystals of ta

Of Tartareous Acid.

Obtained from *Acidulous Tartrite of Potaſh* by means of *Lime*, or *Carbonate of Lime*, and the ſubſequent addition of *Sulphuric Acid* (*Acidum Tartari cryſtalliſatum* P. Suec.). May alſo be prepared by the *Sulphuric Acid* alone.

Cryſtalliſes in ſmall tranſparent ſcales or needles. Not altered by expoſure to *Air*. Readily ſoluble in *Water*, and of an agreeably acid taſte.

Eaſily decompoſed by *Heat*.

Yields *Oxalic Acid* by treatment with the *Nitric*; and *Acetous* by digeſtion with *Water* and *Spirit*.

In union with *Potaſh* forms, according to the proportions, *Tartrite of Potaſh* (*Kali Tartariſatum* P. L.), or *acidulous Tartrite of Potaſh* (*Cremor Tartari* P. L.), and with *Soda*, *Tartrite of Soda* (*Natron Tartariſatum*, P. L.)

Diſſolves *Lime*, *Magneſia*, and *Alumine*.

Diſſolves alſo ſeveral of the *metallic Oxyds*, and precipitates many of them from their ſolutions in other *Acids*.

Differs only from the foregoing in the proportion of its *Oxygen.*

Order of Attraction, *Lime, Baryt, Magneſia, Potaſh, Soda, Ammoniac, Alumine, metallic Oxyds, Water, Spirit.*

Uſe confined to *Medicine.*

Of Pyro-tartareous Acid.

Obtained from *acidulous Tartrite of Potaſh,* or the *Tartareous Acid* by diſtillation with a ſtrong *Heat.*

Form, *liquid.*—Taſte, *empyreumatic.*

Rediſtillation dangerous, from the ſudden evolution of elaſtic matter.

Compounds of this *acid* not as yet examined.

Of Oxalic Acid.

Obtained from *Sugar, Malt, Galls,* and various other ſubſtances, by treating them with *Nitric Acid.*

Form *concrete.* Cryſtalliſes into tranſparent quadrangular *Needles.* Taſte very *acid.*

Oxalic Acid

Is procured from many vegetable & Animal substances by treatment with Nitric acid, & is peculiarly sour, by pouring nitric acid on Sugar in a retort a considerable quantity of nitrous gas is evolved & gradually escapes (and the process should therefore be conducted in an open chimney) on the cooling of the materials left a concrete saline salt is produced & which is rendered very pu by repeated solution, & this is the aci of Sugar. This acid is the result of the decomposition of the carbonic gas of the ch -coal of the vegetable or animal substan employed & of the oxygen contained in th nitric acid, the latter also being decomposed. For the base of all acids is charco & oxygen uniting in different proportions This Salt has a very solvent power over ye oxyd of Iron as well as the nitrous & muriatic acid have, hence its use in taking out Iron moulds in linen as n having a tendency to destroy the textur of the cloth, the acid of Sorrel is chiefly used for this purpose; but the more important use of this acid is to detect the presence of calcareous earth, of which is a very delicate test, producing an insoluble precipitate; the acid exceedi every other substance in its power of attracting this earth; it is commonly therefore used in the analysis of mineral waters, &c a grain or two of this salt added to lime water immediately produces turbidity & a white precipitate as many inflammable articles being capable of producing the acid of Sugar by the decomposition of the nitric acid, it is supposed that it is the result of the decomposition of the oxygen of the acid, the oxygen uniting with the particular inflammable substance used with it.

Of Gallic Acid

is obtained from Galls & other vegetable ast
=gents in infusion. The infusion at leng
becomes Mouldy & from this is obtaine
salt in Crystals, which are sour but n
astringent, very different from the qu
=lities of the base; it is most soluble in
spirit, The most useful property of it i
its producing a black colour with ox
of Iron. & hence its use in making In

Readily ſoluble in *Water*: ſoluble alſo, and without decompoſition, in the *Sulphuric* and other *Acids, Spirit of Wine, Æther, eſſential,* and *expreſſed Oils.*

Eaſily decompoſed under the application of the higher degrees of *Heat.*

Forms peculiar compounds with the *Alkalis,* with moſt of the *Earths,* and with ſeveral of the *metallic Oxyds.*

Is more eſpecially remarkable for its affinity with *Lime,* with which it produces an inſoluble compound.

Would appear to conſiſt of the ſame elements with the former *Acids,* but in different proportions.

Order of Attraction, *Lime, Baryt, Magneſia, Potaſh, Soda, Ammoniac, Alumine, metallic Oxyds, Water, Spirit.*

Uſed to take out *Iron-moulds,* and as a teſt for diſcovering the preſence of *Lime.*

Of Gallic Acid.

Obtained from *Infuſion* of *Galls,* by continued expoſure to *Air,* edulcoration of the *Precipitate* which takes place, and ſubſequent *Cryſtalliſation.*

Forms ſmall granular or needle-like *Cryſtals*, of a ſour but not aſtringent *Taſte.*

More ſoluble in *Spirit* than in *Water.*

Burns in the open fire, leaving behind a hard inſoluble *Charcoal.*

In cloſe veſſels, yields an *acid Liquor* and a *whitiſh ſaline Sublimate.*

A ſimilar ſalt procurable from Galls, by *ſimple Diſtillation.* This alſo called *Gallic Acid.*

Remarkable for the property of producing a black colour with *Iron* and its ſolutions; hence the formation of *Ink.*

Hydro-carbon probably the baſis of both theſe forms of *Gallic Acid*, but united with different proportions of *Oxygen.*

Of Citric Acid.

Obtained from the juice of *Lemons, Citrons*, and other fruits, by a proceſs ſimilar to that employed for the preparation of *Tartareous Acid* from the *acidulous Tartrite of Potaſh* by *Lime*; or by congelation on expoſure to intenſe degrees of *Cold.*

but if it be employed in small quantity, the colour is a purple, & this is ye cause the colour of chalybeate springs, & hence this acid becomes a test of ye chalybeat uality of waters which is in proportion the change produced on the addition the Acid of the infusion of Galls

Of Citric Acid

Saturate the Juice of the lemon &c. with lime in order to seperate the mucilage, then by the addition of sulphuric acid, which unites with the lime, you obtain the pure Citric acid which sh.d be chrystalized; this is the method proposed by Mr. Scheele & is a very excellent one, as the acid no longer suffers from age; Another mode of increas.g the acidity or rather of obtaining the acid in its purer state is to freez

the aqueous part -

Form *concrete*. *Cryſtalliſable.*

Not ſubject to alteration by keeping. Forms particular compounds with the *Alkalis* and moſt of the *Earths*.

Action on *Metals* not remarkable.

Convertible by means of the *Nitric*, into *Oxalic* or *Acetic Acid*.

Order of Attraction, *Lime*, *Baryt*, *Magneſia*, *Potaſh*, *Soda*, *Ammoniac*, *Alumine*, *metallic Oxyds*, *Water*, *Spirit*.

Uſes, in the more common form, in *Diet* and *Medicine*.

Of Malic Acid.

Obtained from the juice of *Apples*, and other *Fruits*, by ſaturating it with *Potaſh*, adding to the compound a ſolution of *Acetite of Lead*, and decompoſing the *Malate of Lead*, thus produced, by *diluted Sulphuric Acid*.

Form *liquid*. Taſte *agreeably acid*.

In union with *Alkalis*, forms *deliqueſcent Salts*. Unites alſo with moſt of the *Earths*.

Upon *Metals*, excepting *Iron* and *Zinc*, has no remarkable effect.

Is eaſily convertible into *Oxalic* or *Acetic Acid*; by treatment with the *Nitric*.

Conſidered as intermediate between *Tartareous* and *Oxalic Acid.*

Of Benzoic Acid.

Obtained in the dry way, by ſublimation from *Gum Benzoin* (*Flores Benzoes* P. L.); or, in the moiſt way, by mixing and boiling it with *Lime*, filtering the liquor, and adding *Muriatic Acid.*

Form *minutely cryſtalline.* Taſte *indiſtinctly acid.*

Soluble both in *Water* and *Spirit*, alſo in different *Acids*, and without being decompoſed.

Melts in *cloſe Veſſels*; and burns in the *open Fire.* Unites into cryſtalliſable compounds with the *Alkalis* and ſeveral of the *Earths.*

Neither the *Order of Attraction*, nor the *Compoſition* of this acid, as yet ſufficiently aſcertained.

Of Benzoic Acid

In subliming the Gum Benzoin after the first sublimation submit it to a considerable degree of pressure by means of plates & screws in order to press out the Empyreumatic oil & then repeat the sublimation.—

Pyro ligneous Acid

It is now economically obtained on a large scale from the distillation of Wood, it is a solvent of the oxyd of Iro & if to this an infusion or decoction of any of the astringent vegetables be added, a black, blue, or purple colour is produced which is employed extensively in the art of Dying cloth; the acid of tartar or vinegar would answer the same purpose of course would be expensive & the mineral acids wo be destructive to the texture of the materials.

Of Pyro-ligneous Acid.

Obtained by diſtillation, from *Birch*, *Beech*, and many other woods.

Form *liquid*. Taſte *acid*. Specific gravity 49 to 48.

Decompoſes in the open *Fire*.

Unites with *Alkalis*, *Earths*, and *Metals*.

Order of Attraction, *Lime*, *Baryt*, *Potaſh*, *Soda*, *Magneſia*, *Ammoniac*, *metallic Oxyds*, *Alumine*, *Water*, *Spirit*.

Radical of this acid *Hydrogen* and *Carbon*.

Of Pyro-mucous Acid.

Obtained by diſtilling *ſaccharine Subſtances* in a ſtrong heat; rediſtilling the liquid product, and afterwards concentrating it by *freezing*.

Taſte *very penetrating*. Colour *yellowiſh*.

Unites with the *Alkalis*, *Earths* and *Metals*.

Order of Attraction, *Potaſh*, *Soda*, *Baryt*, *Lime*, *Magneſia*, *Ammoniac*, *Alumine*, *metallic Oxyds*, *Water*, *Spirit.*

Conſiſts chiefly of water and oil ſlightly *oxygenated.*

Convertible by the *Nitric*, into *Oxalic* or *Malic Acid.*

Of Camphoric Acid.

Obtained by the diſtillation of *Nitric acid* from *Camphor.*

Forms *ſilver-white parallelopiped Cryſtals.* Taſte *bitteriſh*, *ſour.*

Soluble in *Water*, inſoluble in *Spirit.*

Unites with the *Alkalis*, *Earths*, and *Metals.*

Thought to have the ſame baſis as *Oxalic Acid.*

The *animal Acids* are, the *Phoſphoric*, *Lactic*, *Saccho-lactic*, *Formic*, *Pruſſic*, *Sebacic*, *Lithic*, and *Bombic.*

Of Camphoric Acid

The camphor is an highly inflammable ubstance yet it diſsolves quiescently in the Nitric Acid without heat in which it iffers from other Inflammable substances, s eſsential Oils, but which it much resembles in other respects; but if the solution be submitted to heat, the camphor btains acid properties by uniting with the oxygenous principle of the nitrous acid.

Of Phosphoric Acid

This Acid is found in the bones of Animals, in lime & many other minerals, & in article Phosph. p. 124 seq. & is extremely inflammable it is obtained by simple combustion of the substances into which it enters, in long exposure to air, by which it enters, in long exposure to air, by which it takes in large quantity of oxygen, which which it increases its bulk communicates to it acid properties; or, by solution of the substances in the nitric acid by the assistance of heat, by which the phosphorus burns rapidly, & if this be distilled in retort, all the residue is the acid of phosphorus, the phosphorus uniting with the oxygen of the nitric Acid. If the acid of Phosphorus be partially decomposed is reduced to the state of Carbonic acid gas —

Of Phoſphoric Acid.

Sources of this acid various. Modes of obtaining it various alſo. Uſually procured from common *Phoſphorus*, by deflagration; or by ſlow combuſtion, under long expoſure to air; or by treatment with the *Nitric Acid.*

Cryſtalliſes into quadrangular *Priſms.* Taſte *acid*, but not *corroſive.* Specific gravity 2,687.

Has a ſtrong attraction for *Moiſture*, producing heat.

Under the application of the higher degrees of *Heat*, fuſes into a tranſparent *Glaſs.*

With the *Alkalis*, *Earths*, and *Metals*, forms particular compounds. With *Soda*, *Phoſphate of Soda* (*Soda Phoſphorata* P. Edin.). With *Silex*, in the dry way, a deliqueſcent glaſs. With *Iron*, *Phoſphate of Iron (cold ſhort Iron).*

May be partially or totally decompoſed, by treatment with different *inflammable Subſtances.*

In diſtillation with *Charcoal*, reproduces *Phoſphorus*; this therefore conſidered as its *Radical.*

Order of Attraction, *Lime*, *Baryt*, *Magneſia*, *Potaſh*, *Soda*, *Ammoniac*, *Alumine*, *metallic Oxyds*, *Water*, *Spirit*.

Of Lactic Acid.

Obtained from *ſour Whey*, by evaporating it to a certain point, filtering, adding firſt *Lime-water*, and afterwards *Oxalic Acid*, ſeparating the *Oxalate of Lime* by decantation, evaporating the decanted liquor to the conſiſtence of honey, diſſolving in *Alcohol*, adding *Water*, and drawing off the ſpirit by diſtillation.

Form *liquid*.

Eaſily decompoſed by *Heat*. With the *ſaliſiable Baſes* forms compounds which do not cryſtalliſe.

Would ſeem analogous to *Acetous Acid*. Order of Attraction the ſame.

Of Saccho-lactic Acid.

Obtained from *Sugar of Milk* and other ſubſtances, by treatment with the *Nitric Acid* in a ſimilar manner to that employed in the preparation of *Oxalic Acid*.

Form

Lactic Acid

is obtained from the Sour serum of milk &c & is applied to no particular use

Saccho Lactic Acid

The Sugar of Milk is obtained in a powdery form by simple evaporation, & if the Nitric Acid be poured upon this repeatedly a concrete Salt is produced.

Formic Acid

If you disturb a nest of these an
in summer a pungent acid Gas
which is found to stimulate the Ey
Nostrils –

Form *pulverulent.* Colour *white.*

Sparingly ſoluble in *Water.*

Decompoſed by expoſure to *Heat.*

Forms cryſtalliſable compounds with the *Alkalis*; but with the *Earths* and *metallic Oxyds,* ſuch as are inſoluble in water.

Order of Attraction, *Lime, Baryt, Magneſia, Potaſh, Soda, Ammoniac, Alumine, metallic Oxyds, Water, Spirit.*

Of Formic Acid.

An acid liquor ſecreted by *Ants,* more eſpecially the *Formicæ rufæ Lin.* May be collected by expreſſion; or cautious ſimple diſtillation; or by infuſing them in *Water,* or *Spirit,* and ſubſequent diſtillation of the liquor, which may be concentrated by expoſure to *Cold.*

Has a *pungent Smell,* and when diluted, a taſte *agreeably Acid.*

Forms particular compounds, with the *Alkalis, Earths,* and *metallic Oxyds.*

Order of attraction, *Baryt*, *Potaſh*, *Soda*, *Lime*, *Magneſia*, *Ammoniac*, *Alumine*, *metallic Oxyds*, *Water*, *Spirit*.

Of Pruſſic Acid.

Obtained from *Pruſſiate of Iron (Pruſſian Blue)* by boiling it in a ſolution of *Potaſh*, adding *Sulphuric Acid* to the liquor when filtered, and ſubmitting it to diſtillation; or by diſtilling a mixture of *Pruſſiate of Potaſh*, and diluted *Sulphuric Acid*, and rediſtilling the product from *Carbonate of Lime*.

Form *gaſeous*.

Unites readily with *Water*.

Combines with *Alkalis*, *Earths*, and *metallic Oxyds*. With *Oxyd* of *Iron* reproduces *Pruſſian Blue*.

Conſiſts of the ſame elements as *Carbonate* of *Ammoniac*.

Order of Attraction, *Potaſh*, *Soda*, *Ammoniac*, *Lime*, *Baryt*, *Magneſia*, *metallic Oxyds*, *Water*, *Spirit*.

Prussic Acid

Prussian Blue or Prussiate of Iron
prepared by adding to a quantity of dried
Blood or the shavings of the horns or
nes of Animals some potash in an
Iron pot & fluxing them by a necess
ary degree of heat. The brownish mat
left behind is to be diluted with water
which also is to be added a solution of
lue vitriol & Alum, which is to be
filtered in order to obtain ye substance
question, from which a peculiar
cid by distilling it with sulphuric
cid & carbonate of Lime. This acid
by uniting with the oxyd or with
any of the other soluble forms of Iron

always produces a delicate blue colour
which therefore is another test of the
-sence of Iron in a Soluble form & w
commonly use the Acid in the form
the Precipitate of lime. This has
considered as a very curious subje
& has been fully treated of by Macq
Scheele, Bergman & others. This a
does not preexist in any of the mat
-rals used for its production, for if ch
-coal be put into an earthen or glass
-sel & be made red hot & ammoni
gas passed thro it, if the elastic m
-ter ~~be~~ evolved be collected, it will b
found capable of producing ye pru
blue with oxyd of Iron, therefore w
-lieve it to be the same as the car
-nate of lime, -

Sebacic Acid or Acid of Fat

imal Fat is used extensively in the nufacture of Soap & it is found that if fat be rancid before it is boiled with caustic alkaline matter it produces leſs quantity of Soap than when recent, as there is a mixture of expressed animal Oil & alkali & commonly caustic mineral alkali is employ for this purpose. The difference of Fat with respect to its purity depends the extrication of a large quantity acid matter which destroys a proportion the Alkali; a quantity of Caustic Al= li is also produced by the process & wch akes a considerable article in trade. The d is also obtained from unctuous ve= table oils by simple distillation

Lithic Acid

This acid was discovered by Scheele ;
is nearly insoluble in water. Since th
discovery it has been supposed that th
=nary calculi are formed by this aci
but the quantity procured from suc
=culi is very various & there is no so
of correspondence amongst different ca
=culi & we are confident that if Sche
had examined them he would not ha
written so superficially on them, fo
this is the least satisfactory of all
his Essays —

Of Sebacic Acid.

Obtained from *animal Fat*, by ſimple diſtillation, or in a more pure form by melting *fatty Matter* with *Lime*, boiling the mixture in *Water*, and decompoſing the cryſtalliſable ſalt (*Sebate of Lime*) thus procured, by the addition of *Sulphuric Acid* and ſubſequent diſtillation.

Form *liquid.*

In ſeveral reſpects analogous to the *Muriatic Acid.*

With the *Alkalis*, *Earths*, and *metallic Oxyds*, forms peculiar compounds.

Order of Attraction, *Lime*, *Baryt*, *Magneſia*, *Potaſh*, *Soda*, *Ammoniac*, *Alumine*, *metallic Oxyds*, *Water*, *Spirit.*

Of Lithic Acid.

Obtained from the ſimple diſtillation of *Urinary Calculus.*

Form *concrete.*

Difficultly

Difficultly ſoluble in *Water*.

Forms with the *Alkalis*, *Earths*, and *metallic Oxyds*, compounds as yet but little known.

Of Bombic Acid.

Obtained by expreſſion, or infuſion in *Alcohol*, from the *Silk Worm*, when in the ſtate of *Chryſalis*.

Form *liquid*. Taſte *penetratingly acid*. Colour *yellow*.

Combinations not yet examined.

OF ALKALIS.

Diſtinguiſhed, by being of a pungent, lixivial, or urinous taſte, and changing moſt vegetable *blue* colours to *green*, and many of the *yellows* to *brown*.

Have, like moſt of the acids, a ſtrong attraction for *moiſture*.

They manifeſt alſo an extenſive diſpoſition to

Alkaline Bodies

ese are opposite in all their properties to
ids except in having a strong attraction for
isture & their combinations are therefore
utral, alkaline or acidulous according
the proportions in which they are united.
he Alkalis are 3 in No. & on the application
heat 2 of these are fixed & the other volatile.
rom the minutest attention we are at
esent obliedged to say that 2 of these are
imple & one compound, altho we suspect
whether ~~[illegible]~~ they are not all compound. Some
lieve that they derive their origin from
rthy substances but we are not certain
this & we rather consider them as simple
It has been imagined that they are pro-
ducts of heat or combustion, the vegeta-
ble & mineral alkali is we believe a
new substance actually generated as
would appear by many new experiments.
Thus the fixed preexist is proved by ad-
ding to a solution of chrystals of tartar any
ther acid & we obtain from it a compound

salt, the same as if the cream of tarta
had undergone previous combustion & had
saturated the alkali with acid, as the s
-phuric acid, & the product w^d have been s
-phat of Potash or vitriolated tartar; the
alkali procured by the burning of the Cr
of tartar will be more in quantity than
be produced fr. any other decomposition.

Alkalis are called fixed because they have
greater power of acting on a great vari
earthy substances than the volatile alk
Most kinds of glass are formed of flinty
or quartz & of these alkalis - All the Alk
unite with Sulphur & they render the
more soluble & the compounds take y n
of Livers of Sulphur, hence sulphur is
-ted in the water of Springs for of itself
-phur is insoluble in water, & is now
-ted, the alkali having been decompos
The Alkalis combine with the metal
oxyds & unctuous substances as well
with the earthy bodies & render them
soluble in water; with the unctuous
they form saponaceous matter -

Of Vegetable Alkali or Potash

he fixed alkalies differ very little in their anner of production. It is generally produced dissolving the ashes, which are the result the combustion of vegetable or woody atter, in water. filtering & evaporating ye lution so as to obtain ye alkali ~~to a certain point~~ - is united only with rbonic acid gas in small proportion - Soda is tained nearly in the same way by similar atment of ye Sea Weed or Thrift first by lving the ashes & evaporating the solution a certain point - Kali also procured from carbonate of Potash by treatment with me - Vinous liquors deposit tartar, which hen calcined yields the fixed veget: Alkali large quantity - In the neighbourhood large cities where animal & vegetable atter is constantly undergoing putrefac- we obtain common nitre. Ammonia procured in a similar way; all of them ave a certain mixture of carbonic Acid ich renders them mild & are then said to in the aerated or carbonate form, & hen they are deprived of this air they

become caustic & are called pure. The Mi
may be rendered caustic by the addition
of quick lime to them when dissolved in
water, the lime having a greater attrac
for the carbonic acid than the alkali &
lime is restored to its original state &
alkali becomes caustic. The Mild & C
alkali have many properties in comm
with each other, as colour, smell, attracti
for acids, changing vegetable Blue to G
The caustic may be rendered mild ag
by exposure to air. The Carbonate of Po
is the Potash in its purer state as wh
it imported from America; when in a
purer state it is termed Pearl Ash. It i
=dom united with so little carbonic acid as
as to render it neutral. Solution of yͤ car
=nate of Potash in water in a cer. tain
=portion forms the Aqualkali; but if the
made by the simple deliquescence of
crystals it is much nearer the point of
=turation. This Potash w.h 4 or 5 times its q
=tity of well burnt quick lime & if added in
boiling water in will form a paste to

union with other bodies. With the acids, as before mentioned, they conſtitute *neutral Salts.*

With unctuous ſubſtances, they form *Soaps.*

They are uſually divided into *fixed* and *volatile.* The *fixed* ſubdivided into *vegetable* and *mineral.*

The *fixed* ſuſpected, the *volatile* known, to be compounded.

Of Vegetable Alkali. (Potaſh.)

Appears to be a conſtituent part of moſt vegetable ſubſtances, enters alſo into the compoſition of ſeveral ſaline minerals. Obtained from *Carbonate of Potaſh*, by treatment with *Lime.*

Form *concrete.* Taſte extremely *pungent. Cauſtic.* Colour *white.*

Has a ſtrong attraction for *moiſture.*

On ſolution in water produces an increaſe of temperature (*Aqua Kali puri* P. L.).

Fuſible in a moderate, and volatile in an intenſe, *Heat.*

Promotes the fuſion of *Earthy Bodies* and of *metallic*

metallic Oxyds; hence the preparation of different kinds of *Glaſs*. Unites readily with all the *Acids*.

Its more important compounds are,

1ſt. *Sulphate of Potaſh* (*Kali vitriolatum* P. L.), prepared uſually from the ſaline maſs, which remains after the diſtillation of *Nitric Acid*.—Form, *cryſtalline*.—Taſte, *ſaltiſh bitter*.—Difficultly ſoluble in water; alſo very difficult of fuſion.—May be decompoſed either in the moiſt way by *Baryt*, or in the dry way by calcination with *Charcoal*.—Application chiefly *medical*.

2d. *Nitrate of Potaſh* (*Kali Nitratum* P. L.) obtained in the Eaſt Indies and other countries by the elixation of certain ſoils, in which it is either already contained, or produced artificially by the addition of *Potaſh*.—Thoſe ſoils more eſpecially productive in which vegetable and animal matter have run into a ſtate of putrefaction.—Freed from extraneous ſaline matter by repeated cryſtalliſation.—Form of its cryſtals *priſmatic*.—Taſte, *cold*, *ſaline*, *penetrating*.—Much more ſoluble in hot than cold water.—In a moderate heat undergoes watery fuſion (*Sal-prunel*).—An increaſe of the heat produces a decompoſition

Boils Flowers add more water & decant
filtre the fluid thro' sand or powdered
ss & you have the Lix: kali Puri, & wd.
en evaporated down in a glass or silver ves=
l you have the concrete pure kali or La=
is Infernalis, which may be made into
oulds by casting it in a crucible; This is
liquescent in the atmosphere has a strong
traction for moisture & is by far ye purest
most active form of the vegetable alkali
may be rendered mild by recalcining it.
This is a case of double elective attraction,
e lime giving the alkali caloric & takin
om it fixed air. But the same may
done by applying heat to a sufficient
tent to the fixed alkali; all the chrys-
llized saline substances in solution
roduce cold, all the caustic ones give out
heat. The Alkalis give glass particu=
r tinges which are well known to ye
Metallurgist _ Dr. Black has thrown
much light on this subject
All the 3 Alkalies combine with ye

Acids of which there are upwards of 20,
compounds of them with these are many of
& no use. They unite intimately with
-phur & in union with unctuous substan
they form soap but more imperfectly
than mineral Alkali; the vegetable
is commonly used for ye preparation of So
for medical purposes - The addition of c
salt in the process of soap making fro
vegetable alkali produces an additiona
quantity of alkali & makes the soap har
The aerated veg: alk: is very useful in ref
-ing & assaying of metals &c. The Calx ke
-piri is made of ye vegetable alkali wi
a particular proportion of quick lime;
plastic form from ye Veg: Alk: acetate
with Sulphuric acid, Kali vitriolat
with nitric acid Kali nitratum - t
are called acetates, sulphates, &c -
If the Kali acetatum be empyreuma
-tic it must be dissolved in Sp:t Wine, w
dissolves the saline part & leaves it o
[illegible] it [illegible] then [illegible] whiter colour,

more efficacious. It is certainly more diure=
than the other saline compounds, but it
ould be given in 3 times the usual quan=
ity or even ʒj in Inf: Gentia. - Kali Ni=
tratum common or prismatic nitre
called in contradistinction to quadrangu-
ar nitre - It is procured from the union
Veg: Alkali with nitric acid, or from
the residuary matter of the acidum Nitro=
um with the Alkali. It is imported
om the East Indies, Spain, France,
ortugal, &c Common Soil mixed with Ani-
mal or vegetable matter undergoing putre-
action produces the pure or Calcareous Nitre
which is readily decomposed by the addition
ommon salt, alkali or lime provided it
not too much diluted by rain - It is
ore abundant in the Soils of Cities, &
dunghills, for obvious reasons, but in
East indies it is found in large tracts
country remote from towns & many
procured by dissolving the earth in water
a be set by for repeated evaporation &
olution & chrystallization, but it as

is imported into this country it is impu
from admixture of heterogeneous matter
calcareous nitre & magnesia, lime i
=mon salt & is called rough nitre being
confused chrystals. For medical purposes
Gun powder it requires purification whi
is as regularly conducted in this country
assaying of Gold & Silver by Government and the
process of the shooting of the chrystals on
large scale is very beautiful. This sal
unaffected by exposure to air, more so
in hot than cold water; solution punge
cold, exposed to a moderate heat undergo
watery fusion, liquefying & is decompo
leaving little behind but the veg: alk
which constitutes its basis, & this m
the evaporation of the nitric acid but
decomposition of it, consisting of very pure o
or dephlogisticated gas, the addition of char
renders it more luminous. But if ni
exposed to excessive heat, or by holdin
match over it, the nitric acid underg
decomposition producing a strong com
leaving behind only pure Veg: Caustic
which was of pure alkaline base of

compoſition of its *Acid*; the *Alkali* remaining unchanged.—May be more readily decompoſed by the addition of *Charcoal* or other inflammable matter; hence the preparation of *Gun-powder*.—When decompoſed in the moiſt way, by treatment with the *Sulphuric*, furniſhes *Nitric Acid*.—Uſed extenſively in *Glaſs-making*; *Metallurgy*; preparation of *Gun-powder*; and for *dietetic* and *medical* purpoſes.

3d. *Acidulous Tartrite of Potaſh*, prepared from *crude Tartar* (the ſpontaneous depoſite from new wine) by ſolution, and evaporation (*Cremor Tartari* P. L.), or by cryſtalliſation under cooling (*Tartari Cryſtalli* P. L.).—Form *cryſtalline*.—Taſte agreeably *acid*.—Of little ſolubility in *Water*.—Decompoſed by the application of *Heat*; chief products, *Pyro-tartareous Acid*, and *Carbonate of Potaſh*, therefore called *Salt of Tartar*.—Of various application in the arts, as in *Tinning*, *Dying*, *Hat-making*; employed alſo extenſively in *Medicine*.

4th. *Tartrite of Potaſh* (*Kali Tartariſatum* P. L.); prepared from the ſolution of the former, either by precipitating its exceſs of acid, by means of *Chalk*, or by ſaturating it with additional *Potaſh*.

Potaſh.—Form, *cryſtalline.*—Taſte *ſaltiſh-bitter.*—Attracts moiſture from the atmoſphere; alſo very ſoluble in *water.*—Decompoſed by heat, nearly in the ſame way as the *Acidulous Tartrite of Potaſh.*—Employed only in medicine, as a *mild Cathartic.*

5th. *Acetite of Potaſh* (*Kali Acetatum* P. L.) prepared by ſaturating *Potaſh,* with *Diſtilled Vinegar,* evaporating to dryneſs, melting the remaining maſs, diſſolving it in water, filtering and evaporating a ſecond time.—Form, *flaky.*—Colour, *white.*—Taſte *pungent.*—*Deliqueſcent.*—Eaſily ſoluble both in *Water* and *Spirit.*—Its acid decompoſed in diſtillation.—Yields *Acetic Acid,* on the addition of the *Sulphuric.*—Uſed in medicine as a *Diuretic.*

6th. *Carbonate of Potaſh* (*Kali Præparatum* P. L.) uſually obtained from the aſhes of vegetables by lixiviating them in water, decanting, and evaporating to dryneſs.—Form *powdery.*—Taſte, *urinous.*—Colour, *pearly-white.*—*Deliqueſcent* in a moiſt atmoſphere (*Aqua Kali* P. L.); may then be cryſtalliſed after cautious evaporation.—May be decompoſed in the moiſt way by moſt of the other *Acids,* or by *Lime,* and in the dry way by the ſimple application of *Heat.*—

Uſes

tre; oxygen is also procured from nitre by di-
llation as well as from heating the oxyd of
nganese, & on this decomposition depends
the fulminating power of gun-powder, wh.
compound of a mixture of sulphur, nitre &
arcoal; if the former of these be omitted
two others exhibit nearly the same
ects, depending on the sudden decomposit-
n of nitric acid & the evolution of oxygen;
ce the compounds of nitre become in va-
um from the same principle, so of the com-
ition of sulphuric acid. The proportions
the ingredients for gun-powder are not ac-
rately or uniformly adhered to in diff. coun-
ies. The effects seem very much to de-
end on the intimate mixture & not on the
harcoal procured from so different kinds
Wood as it was supposed formerly; altho
t is purer if procured from
ood; the charcoal must be well prepar-
d & all the articles exceedingly well powdered,
he charcoal for this purpose is therefore to be
lcined in iron cylindrical crucibles exposed
as much heat as it can bear & this to be
ept up for a long time. It is polished by

Letting of particles rub on each other during
a part of its process & it is then called Gun,
gun powder – See Bp Watsons Essays on this
head – The Pulvis Fulminans consists of V.
Alkali nitre & sulphur, after this is melt
it immediately explodes & it undergoes p
=ticular alterations of colour before it fus
first exhibiting a liver colour, gradually b
=coming browner, depending on the extri
=tion of Hepatic or sulphureous gas, (wh is i
=flammable gas with oxygen holding in so
=tion sulphur – When vegetable alkali is
=pensive & nitre cheap, the former is obta
usually from the latter. Nitre is very s
=ble in water, generating cold & is therefore
employed for lowering the thermometer, a
=ing to it a quantity of Sal. Ammoniac
assists this quality very much in the W. I.
is employed for cooling Liquors – Nitre
markably lowers the pulse when take
internally & abates thirst; 8 or 10 Grai
are as much as small stomachs can b
but we have seen some bear a Drachm 3
times in 24 Hours, when in of habit of t
=ing it & it is probable that this power of
[illegible] cons. water would be ef

ly useful in acute Rheumatism & many
r inflammatory complaints. It is certainly
owerful antiseptic & when mixed with com.
f it gives animal substances a red colour.
he Quadrangular Nitre is obtained from
mineral alkali & nitric acid. The acidum
itrosum is procured in the moist way fr.
= decomposition of sulphuric acid & nitre.
Acidulous Tartrite of Potash is
tained from the deposit or incrustation of
ine in the vessels containing it, hence ye
fference of crude tartar, cream of tartar
c according to the colour of ye Wine, this
atter to be dissolved in Water & set by for
rystalization. The chrystals differ from
cream in being deprived of the water, of
rystallization in a diff.t manner as speci
ed in the Pharm. Lond. The Cream has
lways the acid in excess; is difficultly solu-
le in water, which excess is removed by ad
dition of chalk or potash dissolved in water
allowing it to precipitate & evaporating
the supernatant liquor in a clean glass or
ther vessel we have the Tartrite of Pot-
sh in a concrete form, but it crystallizes

with difficulty – the Chrystals & cream of t
are very useful in abating heat & thirst & it
both purgative & diuretic. Tartrite of
Potash is the same mixture saturated
point of neutrality.

Of Mineral Alkali, Natron or Soda

– It is chiefly found in the for
Sal Gem, it is the basis of common salt
is therefore called muriate of Soda. an al
inconceivable quantity of it is held in solu
in the water of common springs & sea wa
& ~~on~~ many mines in this country are
posed almost entirely of it in Cornwall,
these are nothing compared to those of Pola
there are many labourers spend their wh
lives in the mines. To procure it in its
or caustic form take the impure or carb
of soda & heat it with quicklime in 8 o
times the same quantity, when it gi
out its carbon & attracts the caloric; i
form taste & causticity, &c nearly the s
as vegetable alkali or potash & acts i
same manner on similar substances
makes more perfect soap than the veg
[illegible] compounds thus

Uſes various, as in *Glaſs-making, Bleaching, Metallurgy, Medicine*, &c.

The order of attraction of this alkali in the moiſt way, *Sulphuric Acid, Nitric, Muriatic, Sebacic, Fluoric, Phoſphoric, Oxalic, Tartareous, Arſenic, Succinic, Citric, Formic, Lactic, Benzoic, Acetic, Saccho-lactic, Boracic, Sulphureous, Nitrous, Carbonic, and Pruſſic, Water, Unctuous Oils, Sulphur, Metallic Oxyds*; in the dry way, *Phoſphoric Acid, Boracic, Arſenic, Sulphuric, Nitric, Muriatic, Sebacic, Fluoric, Succinic, Formic, Lactic, Benzoic*, and *Acetic, Baryt, Lime, Magneſia, Alumine, Silex, Sulphur.*

In ſolution ſometimes preſcribed internally; in the concrete form frequently employed as a *Cauſtic.*

Of Mineral Alkali. (Soda.)

Found in great abundance in the mineral kingdom, particularly in combination with *Muriatic Acid.*—Obtained in a ſeparate form, from *Carbonate* of *Soda*, by means of *Lime*, as in the caſe of *Potaſh*, from *Carbonate of Potaſh.*

Its

Its form, colour, taſte, cauſticity, &c. nearly the ſame with thoſe of the former alkali.

Acts alſo powerfully on the *Earths* and *metallic Oxyds,* and unites readily with *unctuous Subſtances.*

Its more important ſaline compounds are,

1ſt. *Sulphate* of *Soda* (*Natron Vitriolatum* P. L.), obtained by ſolution and cryſtalliſation from the matter left behind in the preparation of *Muriatic Acid, Muriate of Ammoniac,* or *Muriate of Quick-ſilver.* Form of its cryſtals, *priſmatic.*—Taſte, *bitter.*—Effloreſces on expoſure to *Air.*—Readily ſoluble in *Water.*—When expoſed to *Heat* undergoes watery fuſion. May be decompoſed in the ſame way as *Sulphate* of *Potaſh.*—Uſed only as a *Cathartic.*

2d. *Muriate of Soda (Common Salt)* obtained by evaporation from *Sea Water,* or the water of *ſaline Springs,* or the ſolution of *Rock Salt,* which is found in great abundance.—Form of its cryſtals *cubical.*—Taſte, agreeably *ſaline.*—Equally ſoluble in hot as in cold *Water.* Soluble alſo in *Spirit.*—Decrepitates on ſudden expoſure to *Heat.* Melts in a red heat without decompoſition. By

ews its difference from ye Veg: alk. which is
arkable. Medical Soap is prepared from Pot-
h but common Soap from Natron, united
th unctuous matter but more especially
ith animal Oil or Fat, common salt is
ded to the lixivium for this purpose, to give
greater hardness, & which produces, increasing
quantity of mineral alkali. The Kelp
ten used is often used for making Soap
iding, previously burnt, but this contains
me vegetable alkali which decomposes
e common salt, producing more mine-
l Alkali & therefore a more perfect soap.

Sulphate of Soda the form of ye
crystals of this salt is altogether acciden-
l in ye general extemporaneous ways of
aking it from ye matter left behind in
e sublimation of Corr. Sublimate, com
al Ammoniac & Muriatic acid. The
rocess is much like that of ye Kali Sul-
phurat. The above residuary substances
ntaining the mineral alkali by single
d double elective attraction. Attempts have
een made to decompose this salt in order

to attain its alkaline ~~decompose that salt~~ base by ye addi-
-tion of a quantity of coal, by which a liv
sulphur is produced, by means of ye infla-
-mmable principle. It is the cheapest of
the saline compounds & the most ea
of solution; the action of heat dissolves it
its own water of chrystallization only. Th
is probably but little difference in the
action of all the saline cathartic s

Muriate of Soda common cul
-ary or Sea salt. The more slowly & cau-
-ously the evaporation of its solution is co-
-ducted the more pure are the chrystal
the evaporation may be effected by simp
exposure to the dry atmosphere or to the hea
the Sun, in this country it is done far
by exposure to the latter & then to fires
in Cheshire. Bay salt has ye longest
purest chrystals & is the strongest kind
is procured usually by exposure to the su
extended on a large dry soil as that of
clay field, near the sea side, making
platforms of the earth impenetrable

hich is decomposed by the Suns heat, the
rystals shooting at the bottom, form'g
a fine matters in the state of chrystalliza-
n running together, exclude all the fo-
eign matter, maintain'g their own pro-
perties if not mixed with substances w'ch
e be decomposed. If a quantity of concentra-
ted Brine be suffered to evaporate slowly.
bic chrystalls appear, the particles hav'g
ime to arrange themselves naturally.
t Lymington this salt is procured from
solution of Sal Gemma which is found
re in great abundance in union with
ea water & strata of earth, & few mine-
al substances are in great abundance.
So extensive are the Strata of this in Po-
land & so long has it been worked there
hat we are forbid using the Sal Gemma
an act of Parliament. The best way of
urifying this salt is to boil the brine
r solution of it in com'n water then pour'g
in more salt, when the water will take
p the muriate of Lime &c which are more
soluble in hot water & leaving the salt much

more pure, If Nitre & common salt be m
& dissolved, as they have no chemical ef
on each other, the 2 salts will be separate
their own properties. In some parts of this
country, the fire being allowed to go out i
manufactory on saturday night the sal
formed more pure on sunday than on
other days, for the colour & size of its chry
stals vary in diff.t specimens of the salt, d
-ing on the slowness or rapidity of evapor
-on & chrystallization & that which which i
purer is vulgarly called Basket salt, It i
soluble alike in water & Spirit of Wine,
gives us an advantage in making the an
-sis in springs, highly rectified spirit of wi
separating many saline substances - It
-crepitates in the fire from the sudden eva
-ration of its water of chrystallization, t
saline matter resisting causes explosio
it holds so small a quantity of the water
chrystallization that it is insufficient t
-solve it & consequently its particles bur
asunder. It melts in a red heat without d
-composition, hence its use in fluxing m

being intenſely heated may be converted into vapour.—Promotes the fuſion of many of the *earthy* and *metallic* bodies.—May be decompoſed in the moiſt way by *Sulphuric* and *Nitric Acids*; and in the dry way, by the *Phoſphoric*, *Boracic*, and *Arſenic*.—May alſo be decompoſed by *Oxyd* of *Lead*; hence the preparation of *Patent Yellow*.—Of extenſive application in *Agriculture*, *Glaſs-making*, *Glazing*, *Metallurgy*, *Soap-making*, *Diet*, *Medicine*, &c.

3d. *Phoſphate of Soda* (*Soda Phoſphorata* P. Edin.) Obtained by uniting *Phoſphoric Acid* and *Soda* to the point of ſaturation, evaporating, and cooling. Form *cryſtalline*.—Taſte not unpleaſantly *ſaline*.—*Efloreſcent*.—Diſſolves readily in *Water*.—Forms a triple ſalt with *Ammoniac*, (*Sal Microcoſmicus*).—Lately introduced as a *cathartic*.

4th. *Tartrite of Soda* (*Natron Tartariſatum* P. L.) Obtained, by evaporation and cryſtalliſation, from the union of *Soda* with *Tartareous Acid*, by adding to a ſolution of the former *Acidulous Tartrite of Potaſh*.—Form of its cryſtals, *priſmatic*.—Taſte *bitteriſh ſaline*.—In moſt of its properties, and in its application, analogous to the *Tartrite of Potaſh*.

5th. *Borate of Soda*, (*Natron Boracicatum* P. L.) Obtained in an impure form from the ſpontaneous evaporation of the water of certain lakes in the kingdom of *Thibet*; ſaid alſo to be found in *South America*.—Purified by ſubſequent ſolution, boiling, and cryſtalliſation.—Form of its cryſtals, *priſmatic*.—Taſte *ſtyptic*.—Readily ſoluble in *hot Water*.—Changes vegetable blue colours to green.—When heated, parts with its water of cryſtalliſation, and melts into a tranſparent *Glaſs*, which effloreſces on expoſure, and may be again diſſolved in water.—Serves as a flux for all the *Earths* and moſt of the *Metallic Oxyds*.—May be decompoſed in the moiſt way, by the *Sulphuric*, and ſeveral other acids; in the dry way, by the *Phoſphoric* only.—Employed chiefly in *Metallurgy*, and *Glaſs-making*.

6th. *Carbonate of Soda*, (*Natron Præparatum* P. L.) Found native in the iſland of *Teneriffe*, *Egypt*, and elſewhere. Obtained alſo from the aſhes of certain marine plants, by elixation, evaporation, and cryſtalliſation.—Form of its cryſtals, *octohedral*.—Effloreſces on expoſure to *Air*.—Its other properties and uſes nearly ſimilar to thoſe of *Carbonate of Potaſh*.

& shutting out the common air; hence also
' use in glazing earthen ware by merely
ing projected into the furnaces containing
earthen ware, when red hot, by which the
alt is rendered vaporific & fusing the super-
ties of the vessels it glazes them. From
e difference in its action in the dry way &
oist way may be seen the great difference
its electrical attractions. It is decomposed
the oxyds of Lead taking up the oxygen &
iving out mineral alkali & with the same
t yields the Patent Yellow in a crucible
the following process, powder comn. salt
ith oxyd of Lead, wh. is the comn. mini-
nium of ye shops, & dissolve this muriate
Lead in water, when a precipitation oc=
curs which being melted is the production
ention, important only on account of its
urability of colour. The use of Salt in
griculture was discovered by Sir John
Pringle, who found that a small
uantity of it was powerfully septic
to animal & vegetable matter, while
it proves antiseptic when employed in

greater quantity; comn. sand usually
contains a certain quantity of salt & the
its power of fertilizing many soils by oth
many substances. The sal gem or roc
salt, which is the most abundant sourc
of the comn. salt, differs in its comn. app
=ance or purity, it is sometimes term
=nated in fragments which are generally c
=cal, generally is very transparent when whe
pure, but it receives different tinges from v
=ty of mixture, when combined with oxyd of
it is reddish, sometimes it is of a brown colo
given by earthy matter, sometimes of a d
blue, when taken internally in small qu
=tity it is a moderate stimulant, in larg
proportion it is both emetic & cathartic

Phosphate of Soda, this is anoth
product of the mineral alkali in combin
=on with phosphoric acid to the point of s
=ration set by to chrystallize, it then
becomes transparent, & at length losing
water of chrystallization it becomes co
=sed & in this state is the most power
& which depends on the ~~[illegible]~~ solubility
This compound is more grateful to the
[illegible] the other saline cathar

is not more than 1.6 ʒ in lb; it is very so-
ble in water. Tartrite of Soda or
ochelle Salt is obtained from the solution
ream of Tartar with enough mineral
kali to saturate the superabundant acid
in the preparation of Tartrite of Potash, to
vaporated down to chrystallization - It is
uestion here whether we have two salts pro-
ced from the two alkalies or whether the
2: Alk: be not contained in it & we have
triple compound & which we believe is the
ct, tho it is not allowed by other chemists,
he union of the vegetable & mineral Alka-
li with the acid of Tartar. this salt is
of the most elegant cathartics, not
rting with any of its water of chrystal-
zation nor attracting any from the at-
mosphere by keeping. Natron Pre-
paratum is imported in great abun-
dance from the East Indies, the Alkali
is rather in excess, & its consumption here
on is but few in this country. It is u-
sed in giving tints to Glass & in soldering,
& in uniting metals it removes the oxydated
ed, & by the heat employed keeps it in
fluid state, thus suffering the pure

-metal to come into contact with it; it is
little used in medicine except in Gargle
Carbonate of Soda is obtained in a
similar way as the Kali preparat
or potash from the ashes of wood or the
Kelp; the sea flag therefore is only a va-
=ty of the same substance (alkali co-
=bined with Charcoal) as the burnt sp
is a cheaper medicine for which reason it
is substituted for it now by many
The saline compounds of of vegetable
mineral fixed alkali are diff.t in their,
=perties; their other compounds nea-
similar. The mineral Alkali is mu
extensively employed in medicine espe-
=cially in the treatment of Scrophula,
the form of Carbonate of Soda in doses f
℈ss. ʒi twice or thrice in 24 hours it
=ters quickly into the circulation bein
discoverable in the Urine. Ammoni
=ac; is procured in its purest & most a
form (which is gaseous) by decompos
common Crud. Sal Ammoniac by p
Soda or lime by the aid of heat, bein
this form combined only with the Mur

Order of Attraction, alſo, of this Alkali, the ſame as that of *Potaſh*.

Of Volatile Alkali (Ammoniac).

Obtained from the decompoſition of *Muriate of Ammoniac*, by *Potaſh*, *Soda*, or *Lime*.

Form *gaſeous*.—Smell extremely *pungent*.—*Cauſtic*. —*Azotic*. —Lighter than *Atmoſpherical Air*.

Is abſorbed both by *Water* and *Spirit*; by the former with great rapidity, producing an increaſe of temperature and bulk (*Aqua Ammoniæ Puræ* P. L.). *Ice* diſſolved in this fluid, on the contrary, produces cold.

Is in a ſlight degree *inflammable*.

May be decompoſed in various ways; as by expoſure to *Heat*, by the *Electric Spark*, in the reduction of *Metallic Oxyds*, by the diſtillation of *Nitrate* of *Ammoniac*, &c. yielding in ſome caſes *Hydrogen*, in others *Azotic Gas*, which gaſſes by particular modes of combination have been found to reproduce it, and are therefore conſidered as its elements. viz 80.6 [illegible] hydrogen [illegible]

[illegible] azote in [illegible]

hydrogen [illegible] Dr Austin

& Berthollet

The principal ſaline compounds of this *Alkali* are,

1ſt. *Sulphate of Ammoniac.* Obtained by the union of *Sulphuric Acid* with *Ammoniac*, on the addition of diluted *Sulphuric Acid* to liquid *Carbonate of Ammoniac.*—Form, *cryſtalline.*—Taſte, *bitter, pungent.*—Eaſily ſoluble in *Water.*—*Fuſible. Volatile.*—Employed principally in the manufacture of *Muriate* of *Ammoniac.*

2d. *Nitrate of Ammoniac.* Obtained by ſlow evaporation, from the combination of *Nitric Acid*, and *Ammoniac.*—Form, *cryſtalline.*—Taſte *cool, bitter, urinous.*—*Deliqueſcent.*—Eaſily *fuſible.* Under cautious diſtillation, yields *Nitrous Gas, Oxygen Gas*, and *Water*; but detonates when ſuddenly heated.

3d. *Muriate of Ammoniac,* (*Sal Ammoniacus* P. L.) Found native in the neighbourhood of *Volcanos*; prepared alſo, in large quantities, in the dry way, by compounded chemical affinity, from a mixture of *Sulphate of Ammoniac* and *Muriate of Soda.*—Form *concrete.*—Taſte *penetrating, acrid, urinous.*—Readily ſoluble in *Water*, producing cold; ſoluble alſo in *Spirit.* Cryſtalliſes under evaporation into ſmall quadrangular *Priſms.*

tic Acid hence this salt in its crude state
termed Ammoniaca Muriata, & this
id has a superior attraction for the lime,
the original application of heat is suff.
effect their decomposition, the water of
ystallization rendering the addition of
ore water unnecessary, as the salt has
trong disposition to imbibe moisture a
all quantity however may assist its de-
mposition (the glass vessels used for this pur-
se should be previously covered with luting.)
This the ammoniacal gas is readily ab-
bed by water & on mixing a little syrup
violets with it, the colour becomes green)
this forms the Alky ammonia pure. the
receiver heat either from of calcareous
th employed or by the adventitious heat
the furnace & we imagine rather from
former. The gas is pungent to the smell
the condensation of it in water is also
ngent to the smell, & taste & is caustic.
e gas is noxious to respiration & inflammati-
& hence it is said to be somewhat destroy
d that it is in some degree favourable to
flammation is shown by gently immersing a
ighted taper into it. Sometimes it is [illegible]

alk: in water produce cold, which solution in water generate heat. It changes all vege blues to green, like other alkalis, the g somewhat lighter than atmospherical it is absorbed by Spt. Wine & Wine as we by water & the best mode of keeping it a dissolved by Sp. of Wine ~~[illegible]~~ is closely cor'd, which state it is more caustic & forms Ammon & Sp. Ammon Comp. [illegible] Ice put into a vessel containing the ammo=acal gas, it is melted sooner perhaps if thrown into a fire, because by ye dis=tion of the gas absorb water or vice versa Dr. Priestly also has shewn that it is =ly inflammable. The Electric spark & alike decompose this gas. See Mr. Ber=let on this subject. From ye mixture of acid, powdered Tin & lime volatile alka a gaseous form is obtained as was me under the head of Nitrous gas, the lime =uniting with ye muriatic acid then gen & which is all shewn in mercury in experiment. The Ammoniac, [illegible] -moniac [illegible] basis for Sal Ammoniac & is composed of

it is used only for the preparations of crude
ammoniac, adding common salt, &
ining them in an iron pot, in which pro=
this salt is thrown up & collected in an ear=
vessel, it is fusible, volatile & caustic,
in crystallum – **Nitrate of Ammonia**
this is an extremely pungent salt, which
ates when suddenly heated without the addi=
of any other substance, in the same man-
as nitre does with charcoal, if only thrown
a red hot crucible, the utmost caution is
ired therefore in its applications & prepare-
tion. it employed medically, being very
of decomposition its effects would be like
of common nitre, it has been supposed
the former salt is to be employed in Pul=
monic complaints, supplying the portion of
air which is there wanting, but probably
will not give out the same gas in the
mach as in the crucible, nor may the
gas ~~Stomach~~ undergo any such changes in
Stomach as has been supposed & in this
ect medical practitioners have erred egre=
ously on many important occasions.

Muriate of Ammoniac This is the
ost important of the saline compounds of the

Volatile alcali by calcining them in cylin-
=cal furnaces connected by tubes to vessels
=taining water to condense ye gas, forming a
impure spirit of hartshorn with sulphu
acid, & plaster of Paris, selenite or gypsum
now employed for obtaining ye sulphuric
this being a compound of lime & sulphur
acid, adding to it some common salt wh
yields on the one hand the muriate of Am
=niac & on the other Glaubers salt; the cap
mortuum, consisting of oil, is used a
another part of the residuary matter is l
black, or if calcined into bone ash it for
Cornu Cervi ustum, which is insolub
water & therefore employed improper
the Decoct. Cor: Cervi of the Ph. Lond; a
oxyd of Iron is also contained in the resi
matter which is a sort of Colcothar us
painting &c & no part of the product
=fore is wasted. A solution of the mur
of ammoniac in water produces a great
=gree of Cold than com. Salt or Nitr
a mixture of Nitre & Muriate of Am
=niac produces more cold than of eith
alone & for this reason such solution a
employed surgically applied either upon

Priſms.—Of extenſive application in *Dying*, *Tinning*, *Soldering*, &c. uſed alſo frequently in *Medicine.*

4th. *Acetite of Ammoniac* (*Aqua Ammoniæ Acetatæ* P. L.) Prepared by ſaturating *Acetous Acid* with *Ammoniac.* — Form, *liquid.* — Taſte *urinous.*—Employed as a *diaphoretic*; ſometimes alſo uſed externally as a *diſcutient.*

5th. *Carbonate of Ammoniac* (*Ammonia præparata* P. L.) Obtained by diſtillation from moſt animal, and ſome vegetable and mineral ſubſtances; or from the decompoſition of *Muriate of Ammoniac*, by *Carbonate* of *Potaſh* or of *Lime.* Form *concrete.* — Smell, *pungent.* — Taſte, *urinous.* — Very ſoluble in *Water* (*Aqua Ammoniæ* P. L.) Soluble alſo in *Spirit* (*Spiritus Ammoniæ* P. L.) With unctuous ſubſtances forms an imperfect *Soap* (*Linimentum Ammoniæ* P. L.) Like all the foregoing compounds may be decompoſed by *Potaſh*, *Soda*, *Baryt*, or *Lime.*

Agrees nearly with the other *Alkalis*, in the order of its Attraction, both in the humid and dry way.

OF EARTHS.

Diſtinguiſhed by their *Brittleneſs*, *Fixity*, ſparing ſolubility in *Water*, *Inſipidity*, want of *Odour*, incapacity of communicating a tinge to *Glaſs*, and their ſpecific gravity not exceeding that of *Water* more than in the proportion of 5 to 1.

Theſe characters poſſeſſed more perfectly by ſome of the earths than by others; hence the diſtinction into *Saline* and *Inſipid*.

All the earths ſoluble in one or other of the *Acids*, and ſome in all.

Cannot be precipitated from their ſolutions by *Pruſſiate of Potaſh* or of *Lime*, as is the caſe with all metals, *Platina* excepted.

The earths at preſent known are *Baryt*, *Strontian*, *Lime*, *Magneſia*, *Alumine*, *Silex*, *Adamantine Earth*, *Jargon Earth*, and *Sidnean Earth*.

Of Baryt.

Found in combination, 1ſt. with Carbonic Acid, (*Carbonate* of *Baryt*); 2d. with Sulphuric Acid, (*Sulphate* of *Baryt*, *Baroſelenite*); or 3d. with

arkably distinguish on metallic bodies.
ployed externally in medicine it has a
ver of exciting absorption, more especially
n united with vinegar & given interna-
lly it is one of y most powerful diuretics
are acquainted with & has succeeded in
opsy when all other remedies had failed
may be given in doses of ℈ß to ℈i. -

Acetite of Ammoniac -

This is prepared by saturating the acetous acid
th common Ammoniac or a solution of
e carbonate of potash in water. Not easily
ystallized. or it may be prepared by y
rbonate of Ammoniac obtained from
ne animal or vegetable substances, but
t made from the muriate of ammonia
is the purest, it - &, when decomposed with
ne - but it is more common to obtain
is volatile salt by decomposing y muriate
Ammoniac with common chalk dissolved
water with the assistance of heat, the chalk
ntaining carbonic acid,

Sulphuric Acid, Silex, Sulphate of Alumine, Sulphate of Lime, and Petroleum, (*Liver Stone.*)

Obtained in a ſeparate ſtate, by the application of a ſtrong heat, from *Carbonate* of *Baryt* prepared artificially.

Form *pulverulent.* Colour *white.* Specific gravity 4.000.

Soluble in about 900 times its weight of water, communicating to it properties analogous to thoſe of *Lime-water.*

Infuſible.

Unites with the *Sulphuric Acid* into a compound requiring for its ſolution 40,000 times its weight of *Water.* With the *Nitric* and *Muriatic Acid* forms cryſtalliſable ſalts.

Melts with effervefcence when mixed with *Borax* or *Microcoſmic Salt.*

Unites with *Sulphur* into a ſpecies of Hepar, (*Sulphuret* of *Baryt*).

Order of Attraction in the moiſt way, *Sulphuric Acid, Oxalic, Succinic, Fluoric, Phoſphoric, Saccho-lactic, Nitric, Muriatic, Sebacic, Citric, Tartareous, Arſenic, Formic, Lactic, Benzoic, Acetic, Boracic,*

racic, *Sulphureous*, *Nitrous*, *Carbonic*, and *Pruſſic*, *Water*, *Unctuous Oils*, *Sulphur*; in the dry way *Phoſphoric*, *Boracic*, *Arſenic*, *Sulphuric*, *Succinic*, *Fluoric*, *Nitric*, *Muriatic*, *Sebacic*, *Formic*, *Lactic*, *Benzoic*, and *Acetic Acids*, *Potaſh*, *Sulphur*, *Oxyd of Lead*.

The ſoluble forms of this earth remarkable, for their violent effects, when exhibited internally.

Uſed principally as a teſt for aſcertaining the preſence of *Sulphuric Acid*.

Of Strontian.

Found in combination with Carbonic Acid, *Strontheanite*; the expoſure of which to heat furniſhes the pure earth.

Moſt of the properties of this intermediate between thoſe of *Baryt* and *Lime*.

More ſoluble however than either, and remarkable for the property of cryſtalliſing into *tranſparent rhomboidal priſms*.

Attraction, the ſame as that of *Baryt*, as to order, but inferior to it in degree.

Of Lime.

Found 1ſt. uncombined, *Native Quicklime*; 2d. in union with Carbonic Acid and Water, *Calcareous Spar*, *Marble*, *Lime-Stone*, *Chalk*, &c. 3d. with Carbonic Acid and Petroleum, *Swine-Stone*; 4th. with Carbonic Acid and Oxyd of Manganeſe, *Sidero-Calcite*; 5th. with Carbonic Acid and Carbonate of Baryt, *Baryto-calcite*; 6th. with Carbonic Acid, Carbonate of Magneſia, Iron, and Manganeſe, *Muri-Calcite*; 7th. with Carbonic Acid, Magneſia, Alumine, and Iron, *Schiefer Spar*; 8th. with exceſs of Carbonic Acid, Alumine, Magneſia, and Iron, *Dolomite*; 9th. with Fluoric Acid and Water, *Fluor*; 10th. with Phoſphoric Acid, *Apatite*; and 11th. with Sulphuric Acid and Water, *Gypſum*, *Selenite*, *Plaſter of Paris*.

Prepared for various purpoſes from *Carbonate of Lime*, by the continued application of a ſtrong heat.

Form *concrete* or *powdery*. Taſte *hot*, *pungent*, *cauſtic*. Specific gravity 2.3.

Soluble in about 700 times its weight of water (*Aqua*

(*Aqua Calcis* P. L.) Changes vegetable blue colours to green.

On being ſuddenly moiſtened, emits both *Heat* and *Light*, loſing at the ſame time its attraction of coheſion. The ſame takes place ſpontaneouſly on expoſure to *Air*. On further expoſure attracts Carbonic Acid from the Atmoſphere; hence the increaſe of hardneſs obſervable in *calcareous Cements*.

Though infuſible *per ſe*, promotes very powerfully the fuſion of all the other earthy Bodies.

Melts with *Borax* and *Microcoſmic Salt*, without effervescence. Melts alſo with *Oxyd of Lead*.

Forms, with the *Sulphuric Acid*, a compound of little ſolubility in water, *Gypſum*; with the *Nitric* and *Muriatic*, ſalts ſtrongly deliqueſcent.

With *Sulphur*, a calcareous Hepar; with unctuous ſubſtances, peculiar *Soaps*.

Suppoſed in many inſtances to be of animal origin.

Order of attraction in the moiſt way, *Oxalic Acid*, *Sulphuric*, *Tartareous*, *Succinic*, *Phoſphoric*, *Saccho-*

Saccho-lactic, *Nitric*, *Muriatic*, *Sebacic*, *Fluoric*, *Arſenic*, *Formic*, *Lactic*, *Citric*, *Benzoic*, *Acetic*, *Boracic*, *Sulphureous*, *Nitrous*, *Carbonic*, and *Pruſſic*, *Water*, *Unctuous Oils*, *Sulphur*; in the dry way, *Phoſphoric*, *Boracic*, *Arſenic*, *Sulphuric*, *Succinic*, *Nitric*, *Muriatic*, *Sebacic*, *Fluoric*, *Formic*, *Lactic*, *Benzoic*, and *Acetic Acids*, *Potaſh*, *Sulphur*, *Oxyd of Lead.*

Uſed extenſively as the baſis of *Calcareous Cements*, *Plaſter* and *Stucco*; in *Dying*, *Bleaching*, *Tanning*, *Sugar-baking*, and various other arts, beſides its application in *Medicine.*

Of Magneſia.

Found 1ſt. in union with Lime and ſome Iron, *Calci-murite*; 2d. with Silex, Alumine, Lime, Oxyd of Iron, and Water, *Argillo-murite*; 3d. with Carbonic Acid, Silex and Iron, *Silici-murite*; 4th. with Silex and Alumine, *Talc*; 5th. with Silex, Alumine, Iron, and Carbonate of Lime, *Lapis Ollaris*; 6th. with Silex, Alumine, Iron, Air and Water, *Steatites*; 7th. with Silex, Iron, Carbonate of Lime, Alumine, Muriate of Magneſia, and Water, *Serpentine*; 8th. with Silex, Alumine,

mine, Lime, Iron, Air, and Water, *Chlorite*; 9th. with Carbonic Acid, Silex, Carbonate of Lime, Alumine, and Oxyd of Iron, in different proportions, *Aſbeſtos*, *Amianthus*, *Suber montanum*, *Actynolite* and *Jade*; 10th. with Silex, Lime, and Oxyd of Iron, *Baikalite*; 11th. with the Boracic Acid, Lime, Silex, Alumine, and Iron *Boracite*; and 12th with Sulphuric Acid, *Sulphate of Magneſia.*

Prepared from a ſolution of this laſt, by the addition of *Carbonate of Potaſh*, and ſubſequent expoſure of the waſhed earthy precipitate to a ſtrong and continued heat.

Form *pulverulent.* Colour *pure white.* Taſte *inſipid.* Specific gravity about 2.3.

Requires for its ſolution 7900 times its weight of water.

Infuſible without addition, even in the moſt intenſe degrees of Heat; but melts into a glaſs with *Lime*, *Microcoſmic ſalt*, or *Borax.*

Unites with all the Acids. With the *Sulphuric Acid* regenerates *Sulphate of Magneſia* (*Magneſia Vitriolata* P. L.) With *Carbonic Acid*, Carbonate of Magneſia (*Magneſia Alba* P. L.)

Is a principal ingredient in the preparation of the finer kinds of *Porcelain.*

May be combined, in ſmall proportions, with *Sulphur*.

Order of Attraction in the moiſt way, *Oxalic Acid*, *Phoſphoric*, *Sulphuric*, *Fluoric*, *Sebacic*, *Arſenic*, *Saccho-lactic*, *Succinic*, *Nitric*, *Muriatic*, *Tartareous*, *Citric*, *Formic*, *Lactic*, *Benzoic*, *Acetic*, *Boracic*, *Sulphureous*, *Nitrous*, *Carbonic*, and *Pruſſic*, *Sulphur*; in the dry way, *Phoſphoric*, *Boracic*, *Arſenic*, *Sulphuric*, *Fluoric*, *Sebacic*, *Succinic*, *Nitric*, *Muriatic*, *Formic*, *Lactic*, *Benzoic*, and *Acetic Acids*, *Potaſh*, *Sulphur*, *Oxyd of Lead*.

In common uſe in diſorders of the *Primæ Viæ* as an *antacid* and *laxative*.

Of Alumine.

Found united to, 1ſt. Carbonic Acid and Lime, *Lac Lunæ*; 2d. to Silex, *Clay*; 3d. to Silex, Carbonate of Lime, Carbonate of Magneſia, Oxyd of Iron, Air and Water, in different proportions, *Lithomarga*, *Fuller's Earth* and *Bolé*; 4th. to Silex and Iron, *Tripoli*; 5th. to Silex, Oxyd of Iron, Manganeſe, Water and Air, *Lipidolite*; 6th. to Silex, Magneſia, Iron and Lime, in different proportions, *Sapari*, *Hornblende*, and *Baſalt*;

Baſalt; 7th. to Silex, Magneſia, and Oxyd of Iron, *Mica*; without Magneſia, *Micarelle*; 8th. to Silex, Iron, and Carbonate of Lime, *Calp*; 9th. to Silex, Magneſia, Iron, and Petroleum, *Argillaceous Schiſtus*; and 10th. to Sulphuric Acid, *Sulphate of Alumine.*

Obtained in its pureſt form from a ſolution of *Sulphate of Alumine* (common alum), by the addition of *Potaſh*, *Soda*, or *Ammoniac.*

Form *powdery.* Colour, when dry, *pure white.* Feel *unctuous.* Taſte *inſipid.* Specific gravity 2.

Inſoluble in *Water.* When moiſtened becomes plaſtic. Hardens and contracts, when expoſed to the higher degrees of *Heat*; but very difficult of fuſion, therefore the baſis of the different kinds of *Pottery.*

Fuſible, with effervefcence, both with *Microcoſmic Salt* and *Borax.*

Combines with moſt *Acids*, but with great difficulty, except under precipitation. The moſt important of theſe compounds, the *Sulphate of Alumine*; prepared from the decompoſition of *Argillaceous Schiſtus.* Form of its cryſtals *octohedral.*

hedral. Taſte *aſtringent.* Soluble in about 14 times its weight of *Water.* Undergoes watery fuſion, and parts with its water of cryſtalliſation, on expoſure to *Heat* (*Alumen Uſtum* P. L.) When calcined with certain inflammable ſubſtances, as yolk of egg, or ſugar, produces a compound, which takes fire ſpontaneouſly on expoſure to *Air (Pyrophorus* of *Homberg).*

Order of Attraction of *Alumine* in the moiſt way, *Sulphuric Acid, Nitric, Muriatic, Oxalic, Arſenic, Fluoric, Sebacic, Tartareous, Succinic, Saccho-lactic, Citric, Phoſphoric, Formic, Lactic, Benzoic, Acètic, Boracic, Sulphureous, Nitrous, Carbonic,* and *Pruſſic*; in the dry way, *Phoſphoric, Boracic, Arſenic, Sulphuric, Nitric, Muriatic, Fluoric, Sebacic, Succinic, Formic, Lactic, Benzoic,* and *Acetic Acids, Potaſh, Sulphur, Oxyd of Lead.*

Uſes, comprehending thoſe of Sulphate of Alumine, *Dying, Tanning, Printing, Silvering, Painting, Pottery, Medicine,* &c.

Of Silex.

Found in union, 1ſt. with Alumine, Lime, and Iron, as in moſt of the *precious Stones, Hyalite* and *Prehnite*; 2d. with Alumine only, *Schorlite*, and *Calcedony*; 3d. with Alumine and Iron, *Olivin*, *Elaſtic Quartz*, *Obſidian*, *Opal*, *Pitch-ſtone*, *Hornſlate*, *Jaſper*, and *Argentine Felſpar*; 4th. with Alumine, Lime, Magneſia and Iron, *Schorl*, *Thumerſtein* and *Silicious Spar*; 5th. with Alumine, Iron and Manganeſe, *Rubellite*; 6th. with Alumine and Lime, *Quartz*, *Flint*, *Hornſtone*, and *Ædelite*, and with water *Zeolite*; 7th. with Oxyd of Nickel, Lime, Alumine, and Oxyd of Iron, *Chryſopraſe*; 8th. with Lime, Magneſia, Iron and Coal, *Silicious Schiſtus*; 9th. with Alumine, Lime, Sulphate of Baryt, Magneſia, and Iron, *Adularia*, without Iron, *Felſpar*; 10th. with Alumine, Sulphate of Lime, and Oxyds of Copper and Iron, *Labrador-Felſpar*; 11th. with Alumine, Baryt and Water, *Staurolite*; and 12th. with Lime, Sulphate of Lime and Iron, *Lapis Lazuli*.

May be ſeparated from moſt of theſe by digeſtion in *Nitric Acid*.

Colour *white*. *Inſipid*. *Inſoluble*. Specific gravity 2.66. *Infuſible*.

Soluble in the *Fluoric*, but in no other acid.

Soluble alſo in the ſolution of either of the *fixed Alkalis*.

May be fuſed with *Lime*, *Microcoſmic Salt*, or *Borax*; but much more readily with *Potaſh* or *Soda*: hence the preparation of the different kinds of glaſs.

When melted with a large proportion of *Alkali*, forms a deliqueſcent compound, *Liquor Silicum*, the decompoſition of which by an *Acid*, furniſhes a gelatinous precipitate thought to be ſoluble in about 1000 parts of *Water*.

Order of Attraction in the moiſt way, *Fluoric Acid*, *Potaſh*; in the dry way, *Potaſh*, *Boracic Acid*, *Phoſphoric Acid*, *Oxyd of Lead*.

Uſed principally in *Poliſhing*, *Painting*, *Glaſs-making*.

Of Adamantine Earth.

Found combined with Silex, Iron and Nickel, in *Adamantine Spar*, of which it conſtitutes above $\frac{2}{3}$ of the whole.

Inſoluble in *Acids*.

Infuſible with *Alkalis*.

The other properties of this Earth not as yet fully aſcertained.

Of Jargon Earth.

Combined with Silex, Iron, and Nickel, in the Stone called *Jargon* or *Circon.*

Colour, *white.* Specific gravity eſtimated at 4.000.

With *Sulphuric Acid* forms an aſtringent ſalt with ſtelliform cryſtals; with the *Acetous Acid,* a ſalt incapable of cryſtalliſation.

Inſoluble even in a boiling ſolution of *Potaſh.*

Melts with *Borax* without effervеſcence; but infuſible with either the *Fixed Alkalis,* or *Microcoſmic Salt.*

Order of Attraction as yet unknown.

Of Sidneyan Earth.

Found in a mineral, from *Sidney Cove,* conſiſting of white ſand, colourleſs Mica, a few black particles, and white Alumine, with which this Earth appears to be mixed, and from which it may be extracted by the *Muriatic Acid.*

Colour, *white*. Fuſible at 150 of *Wedgwood's Thermometer*.

Not ſoluble either by the *Sulphuric* or *Nitric Acid*.

Precipitable from its ſolution in the *Muriatic Acid*, by *Alkalis*, or by the affuſion of *Water*. Its combination with this Acid may alſo be decompoſed, by the addition of the *Sulphuric*.

Order of Attraction not further aſcertained.

OF METALS.

Diſtinguiſhed by their *Weight*, *Opacity*, and *Splendour*. Alſo remarkable for their power of conducting the *Electrical Fluid*.

Preſented to us by nature under different forms, as, 1ſt. *Native*, i. e. when in poſſeſſion of the properties juſt mentioned; 2d. *Oxydated*, or in union with *Oxygen*; 3d. *Saline*, or united with one or other of the *Acids*; 4th. *Mineralized*, or combined with *Sulphur*; and 5th. *Alloyed*, or in union with each other.

Different proceſſes therefore neceſſary for obtaining theſe bodies in a ſeparate ſtate; hence the *Pounding*, *Waſhing*, *Roaſting*, *Amalgamation*, and *Reduction* of Metallic ores.

May be conſidered inſoluble in *Water* at a common temperature, though capable of decompoſing it, under certain circumſtances.

Differently affected by expoſure to *Air*.

Fuſible and *Volatile* at very different temperatures. All *cryſtalliſe* in cooling. The oxyds of many *vitrifiable*.

Some *Malleable* and *Ductile*, others *Fragile*; hence the diſtinction into *Metals* and *Semi-Metals*.

Some capable, others incapable of *Oxydation* under the joint action of *Heat* and *Air*; hence again the diviſion into *perfect* and *imperfect*.

All metals combinable with one or other of the *Acids*, with which they produce for the moſt part cryſtalliſable ſaline compounds. May be in ſome inſtances converted, by the decompoſition of the acid, into the ſtate of *Oxyd*, in others completely *acidified*.

The

The *Metallic Oxyds,* generally ſpeaking, more readily ſoluble in *Acids,* than the *Metals* from which they are formed.

The ſame more remarkably the caſe with regard to *Alkalis,* which act on few of the metals unleſs they are previouſly *oxydated.*

The *Earths* do not appear to act on metallic ſubſtances, but unite, by fuſion, with their *Oxyds.*

Metals, when united with each other, often undergo remarkable changes of *Volatility, Fuſibility,* and *Specific Gravity.*

By fuſion, moſt of them may be united to *Sulphur.*

All except *Zinc,* ſoluble in *Alkaline Sulphurets.*

The Attraction of the Metals for *Acids* in moſt inſtances inferior to that of the *Alkalis,* and *Earths.*

The perfect Metals are, *Platina, Gold,* and *Silver.*

Of Platina.

Brought from *South America*, in ſmall grains of a dull ſilver-colour, mixed with ferruginous Sand, particles of Native Gold, and Quickſilver.

Both malleable and ductile when pure, though harder than either gold or ſilver.

Specific gravity upwards of 22.

Extremely difficult of fuſion, but when urged by an intenſe heat, becomes capable of being welded.

Diſſolves ſlowly in the *Oxy-muriatic Acid*, communicating to it firſt a yellow, and afterwards a deep reddiſh-brown colour. Inſoluble in the other acids, even with the aſſiſtance of heat.

Differs from all other metals in being precipitable from its ſolution by *Muriate of Ammoniac*; the precipitate, upon fuſion, yielding a malleable Regulus.

Said alſo to be ſoluble in *Sulphuret of Potaſh*.

Is ſcarcely affected in the dry way, either by *Compound Salts*, or by *Sulphur*.

Unites by fuſion in different proportions with many other metals, but moſt eaſily and intimately with *Zinc*. With *Copper* produces a compound of a golden colour, hard, malleable, cloſe grained, ſuſceptible of a fine poliſh, and durable.

Order of Attraction in the moiſt way, *Æther*, *Muriatic*, *Oxy-muriatic*, *Nitric*, *Sulphuric*, *Arſenic*, *Fluoric*, *Tartareous*, *Phoſphoric*, *Sebacic*, *Oxalic*, *Citric*, *Formic*, *Lactic*, *Acetic* and *Succinic Acids*; in the dry way, *Arſenic*, *Gold*, *Copper*, *Tin*, *Biſmuth*, *Zinc*, *Antimony*, *Nickel*, *Cobalt*, *Mangane*ſ*e*, *Iron*, *Lead*, *Silver*, *Quickſilver*, and *Sulphuret of Potaſh*.

Uſe as yet, principally, confined to Chemical and Philoſophical purpoſes.

Of Gold.

Found either alloyed with Silver, Copper, or Iron, *Native Gold*; or combined with Sulphur, Antimony, Arſenic, Lead, Iron and Silver, *Grey Gold Ore*; or with Biſmuth and Sulphur, *White Gold Ore*, *Aurum Graphicum*.

When pure, of a bright yellow colour, ſoft, very tough, ductile and malleable to an extraordinary degree; not ſonorous.

Next to *Platina* the heavieſt body in nature, its *Specific Gravity* being 19.30.

Melts, after ignition, at 32 of *Wedgw.* = 5237 of *Farenh.* and may be volatilized by a more intenſe degree of heat. Cryſtalliſes in cooling, into quadrangular pyramids. Converted by electrical exploſions, into a purple *Oxyd.*

Soluble only in *Oxy-muriatic Acid*, the compound Acid, *Aqua Regia*, and in the ſolutions of *Alkaline Sulphurets.*

The *Oxy-muriatic* ſolution of a yellow colour, ſtains the ſkin purple.

Separable from this ſolution in a metallic form, by *Æthers*, *Eſſential Oils*, and *Phoſphorus*, by *Zinc* and many other metals; may be alſo precipitated by all the *Alkalis* and *Earths*. The precipitate by *Tin*, of a purple colour (*Purple Powder of Caſſius*), and communicates a red colour to glaſs; that by *Ammoniac*, has the property of exploding with great violence when expoſed to a moderate heat, *Aurum fulminans.*

Combines with all the *Metals* in various proportions.

portions. With *Silver* becomes paler; with *Copper* of a deeper colour, more fuſible, harder, and more elaſtic.

May be freed from admixture of imperfect metallic matter, by fuſion with *Lead*, together with acceſs of *Air*; hence the proceſs of *Cupellation.*

Order of attraction, in the moiſt way, *Æther, Muriatic Acid, Oxy-muriatic, Nitric, Sulphuric, Arſenic, Fluoric, Tartareous, Phoſphoric, Sebacic*, and *Pruſſic, Potaſh, Ammoniac*; in the dry way, *Quickſilver, Copper, Silver, Lead, Biſmuth, Tin, Antimony, Iron, Platina, Zinc, Nickel, Arſenic, Cobalt, Manganeſe, Sulphuret of Potaſh.*

Uſed in the conſtruction of *Utenſils* and different kinds of *Ornaments*; in *Enamelling, Gilding, Dying, Soldering*, &c.

Of Silver.

Found, 1ſt. united to a ſmall quantity of gold, *Native Silver*; or 2d. to Arſenic and Iron, *Arſenical Silver*; or 3d. to Muriatic and Sulphuric Acids, Iron, Alumine and Lime, *Horn Silver*; or 4th. to Sulphur only, *Vitreous Silver*; or 5th. to Sulphur, Antimony and Iron, with a

little

little Copper and Arſenic, *Brittle Vitreous Silver*; or 6th. to Arſenic and Sulphur; or to Antimony, Sulphur, and Sulphuric Acid, *Red Silver Ore*; or 7th. to Lead, Sulphur, Antimony, Iron, Alumine, and Silex, *White Silver Ore.*

Colour *white, ſplendid.* Leſs malleable and ductile than *Gold,* but harder and more opake.

Specific gravity 10.47.

Tarniſhes on expoſure to air.

Fuſible at 28 of *Wedgw.* = 4717 of *Farenh.* and by increaſe of heat may be volatilized, and partially *oxydated,* in which ſtate it communicates a yellow colour to *Glaſs.*

Moſt readily ſoluble in *Nitric Acid,* forming with it a corroſive cryſtalliſable ſalt, ſuſceptible of Watery Fuſion (*Argentrum Nitratum* P. L.) Soluble alſo in *Nitro-Sulphuric Acid, Aqua Regina* of *Keir.*

From the *Nitric Acid,* may be precipitated in the form of *Oxyd,* by *Alkalies* and *Earths,* or, unoxydated, by many of the *Metals,* and alſo by *Phoſphorus.* If thrown down by *Lime Water,* the *Oxyd* when dried, and afterwards waſhed with *Ammoniac,* explodes moſt violently on the ſlighteſt agitation, *Argentum fulminans.*

Combines extenſively with the other *Metals.* With *Copper* becomes harder and more ſonorous.

Combines readily with *Sulphur*, and is blackened by *Hepatic Gas.*

Order of Attraction, in the moiſt way, *Muriatic Acid*, *Sebacic*, *Oxalic*, *Sulphuric*, *Saccho-lactic*, *Phoſphoric*, *Nitric*, *Arſenic*, *Fluoric*, *Tartareous*, *Citric*, *Formic*, *Lactic*, *Acetous*, *Succinic*, *Pruſſic*, and *Carbonic*, *Ammoniac*; in the dry way, *Lead*, *Copper*, *Quickſilver*, *Biſmuth*, *Tin*, *Gold*, *Antimony*, *Iron*, *Manganeſe*, *Zinc*, *Arſenic*, *Nickel*, *Platina*, *Sulphuret of Potaſh*, *Sulphur*.

Uſed in the conſtruction of various *Utenſils*; compoſition of *Bell-metal*; in *Silvering*, *Enamelling*, *Soldering*, *Dying*, *Medicine*, &c.

The imperfect metals are *Quickſilver*, *Lead*, *Copper*, *Iron*, and *Tin*.

Of Quickſilver.

Found 1ſt. *Native*; 2d. alloyed with ſilver, *Native Amalgam*; 3d. with Oxygen, *Native Oxyd*; 4th. with Muriatic and Sulphuric Acids, *Horn-*

mercury;

mercury; 5th. with Sulphur, *Cinnabar*; and 6th. with Sulphuret of Potaſh or Soda, *Hepatic Ore.*

Form *liquid.* Colour, *ſilvery-white.*

Specific Gravity 13.56.

Not perceptibly altered by expoſure. By agitation, with acceſs of air, is converted into a black *Oxyd:* a change analogous to this ſeems to take place on trituration with tenacious ſubſtances; hence *Pilulæ Hydrargyri*, *Unguentum Hydrargyri*, &c. P. L.

Volatile at 600° and congeals at 39 below 0 of *Farenh.* When heated with acceſs of air, is converted into a red *Oxyd* (*Hydrargyrus Calcinatus* P. L.)

Combines with, and partly decompoſes, concentrated *Sulphuric Acid*, by the aſſiſtance of heat, producing a ſaline maſs, which by the affuſion of water becomes of a yellow colour (*Hydrargyrus Vitriolatus* P. L.)

Very readily ſoluble in the *Nitric Acid*, with the production of *Nitrous Gas*; the ſolution evaporated produces alſo a ſaline maſs, which upon further decompoſition of the acid by expoſure to heat,

[illegible] of [illegible] by order of [illegible]
the [illegible] [illegible] which
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[illegible]

heat, is reduced to the ſtate of *Oxyd* (*Hydrargyrus nitratus ruber* P. L.)

Not acted upon by the *Muriatic Acid* unleſs through the medium of *Oxygen*, by the aſſiſtance of which it unites with it more powerfully than with either of the former acids; hence the preparation of Muriate of Mercury, by ſublimation, from a mixture of Sulphate of Mercury, and Muriate of Soda (*Hydrargyrus Muriatus* P. L.); of mild Muriate of Mercury in the dry way, by the addition of Quickſilver to the former, and repeating the ſublimation (*Calomelas* P. L.); and in the moiſt way, by the decompoſition of Nitrate of Quickſilver by Muriate of Soda (*Hydrargyrus Muriatus mitis* P. L.)

When oxydated, is diſſolved by the *Acetic Acid*, or may be united with it by adding *Acetite of Potaſh* to a ſolution of *Nitrate of Quickſilver* (*Hydrargyrus Acetatus* P. L.)

May be precipitated from its ſolutions by *Alkalis*, by *Lime* and other Earths, and by ſeveral other metals; the colour of the precipitates differing according to the degree of oxydation. The precipitate from the ſolution of *Nitrate of Quickſilver* by *Ammoniac*, is of a grey colour (*Hy-*

drargyrus Precipitatus Cinereus P. Edin.); from the ſolution of *Muriate of Quickſilver* of a pure white (*Hydrargyrus Præcipitatus albus* P. L.) The precipitates by Alkalis, when mixed with *Sulphur*, poſſeſs the power of exploding if expoſed to a gradual heat.

Combines readily with moſt of the metals, forming what are called *Amalgams*.

Unites with *Sulphur*, by trituration, into a black powder (*Hydrargyrus cum Sulphure* P. L.) by fuſion and ſublimation, into a red ſtriated maſs (*Hydrargyrus Sulphuratus ruber* P. L.) which may alſo be prepared by the diſtillation of a mixture of *Muriate of Quickſilver* and *Sulphuret of Antimony (Cinnabar Antimonii)*.

Decompoſes the *Alkaline Sulphurets*, producing an *Æthiops* with *Sulphurets of Potaſh* and *of Soda*, and a factitious *Cinnabar*, with *Sulphuret of Ammoniac*.

Order of Attraction, in the moiſt way, *Sebacic Acid, Muriatic, Oxalic, Succinic, Arſenic, Phoſphoric, Sulphuric, Saccho-lactic, Tartareous, Citric, Nitric, Fluoric, Acetous, Boracic, Pruſſic, Carbonic*; in the dry way, *Gold, Silver, Platina, Lead, Tin, Zinc, Biſmuth, Copper, Antimony, Arſenic, Iron, Alkaline Sulphurets, Sulphur.*

Uſed principally in the working of *Gold Ores*, conſtruction of *philoſophical Inſtruments, and of Mirrors*; *in Gilding, Painting, Anatomy*, and *Medicine.*

Of Lead.

Found 1ſt. *Native*, though very rarely; 2d. in union with Oxygen, Iron, and Alumine, *Red Lead Ore*; 3d. with Carbonic Acid, a little Lime and Alumine, *Spathoſe Lead Ore*; 4th. with Molybdic Acid, Iron and Silex, *Carinthian Molybdate of Lead*; 6th. with Sulphuric Acid, *Sulphate of Lead*; 7th. with Sulphur and a little Silver, *Galena*; and 8th. with Antimony and a little Silver, *Antimonial Lead Ore.*

Colour, *bluiſh-white*; *ſoft, flexible*, not *tenacious.*

Specific gravity 11.35.

Becomes dull on expoſure to *Air.*

Melts at about 540° of *Farenh.*—In a ſtrong heat boils, and if air be admitted, unites readily with different portions of *Oxygen*; hence the preparations of *Litharge* and *Minium*: by a ſtill

ſtill greater degree of heat may be converted into *Glaſs*.

Unleſs aſſiſted by heat, is not readily acted on either by the *Sulphuric* or *Muriatic Acid.* Diſſolves in diluted *Nitrous Acid*, and forms with it a cryſtalliſable ſalt. On expoſure to the vapour of *Acetous Acid*, is converted into a white *Oxyd* (*Ceruſſa* P. L.), the ſolution of which, in a freſh portion of this acid, produces a cryſtalliſable compound remarkable for its ſweetneſs and aſtringency (*Ceruſſa Acetata* P. L. *Aqua Lithargyri Acetati* P. L.)

Exhibits a browniſh colour when precipitated from its ſolutions by *Alkaline Sulphurets.*

By fuſion with the *Fixed Alkalis*, becomes partially ſoluble in *Water*; and may be oxydated by deflagration with *Nitre.*

Unites eaſily by fuſion with moſt of the metals, more eſpecially with *Gold, Silver, Tin,* and *Biſmuth.*

Produces with *Sulphur*, a grey coloured brittle compound, leſs fuſible than itſelf; with *Phoſphorus*, a compound which is malleable, but more diſpoſed to tarniſh.

The

The *Oxyds* of this metal ſoluble in *Oils*, hence the preparation of certain *Plaiſters*, *Varniſhes*, and *Paints*; capable alſo of decompoſing ſeveral of the compounded ſalts, *Patent Yellow*.

Order of Attraction, in the moiſt way, *Sulphuric Acid*, *Sebacic*, *Saccho-lactic*, *Oxalic*, *Arſenic*, *Tartareous*, *Phoſphoric*, *Muriatic*, *Nitric*, *Fluoric*, *Citric*, *Formic*, *Lactic*, *Acetous*, *Boracic*, *Pruſſic* and *Carbonic*, *Potaſh*; in the dry way, *Gold*, *Silver*, *Copper*, *Quickſilver*, *Biſmuth*, *Tin*, *Antimony*, *Platina*, *Arſenic*, *Zinc*, *Nickel*, *Iron*, *Alkaline Sulphurets*, *Sulphur*.

Employed in medicine, and very extenſively in the arts, particularly in the conſtruction of *Buildings* and different *Utenſils*, in the making of *Shot*, in *Statuary*, *Glaſs-making*, *Glazing*, *Painting*, *Varniſhing*, Refinement of *Gold and Silver*, Compoſition of *Pewter* and *Soft-ſolder*, &c. &c.

Of Copper.

Found 1ſt. *Native*; 2d. united to Oxygen, *Tile ore*; 3d. to oxygen and oxyd of Iron, *Pitch-Copper ore*; 4th. to Carbonic Acid, *red*, *green* and *azure Copper ores*; 5th. to Arſenic Acid,

Arſeniate

Arſeniate of Copper; 6th. to Sulphuric Acid, *Sulphate of Copper*; 7th. to Muriatic Acid, *Muriate of Copper*; 8th. to Sulphur, *Vitreous Copper ore*; 9th. to Sulphur and Iron, *Yellow Copper ore*; 10th. to Arſenic and Iron, *White Copper ore*, and, 11th. to Lead, Antimony, Iron, Sulphur, Silex and Silver, *Grey Copper ore.*

Colour, *reddiſh.* Taſte *nauſeous, Styptic.* Specific gravity 7.788.

Hard, elaſtic, malleable, and *ductile. Sonorous.*

Ruſts on expoſure to air.

If heated changes colour, and is converted into a browniſh red *oxyd.* Melts at 27° *Wedgw.* = 4587 *Farenh.*; and exhibits a bluiſh-green flame.

Soluble by the aſſiſtance of a boiling heat in concentrated *Sulphuric Acid*, forming with it a blue cryſtalliſable ſalt (*Cuprum Vitriolatum* P. L.)

Diſſolves very readily in the *Nitric Acid*, with a production of *Nitrous Gas:* the ſolution of a *deep blue* colour, and affords by evaporation a deliqueſcent ſalt, which detonates on being ſuddenly heated.

Is difficultly acted upon by *Muriatic Acid.* Colour of the diluted ſolution *green.*

By the *Acetous Acid* is rather corroded than diſſolved. If moiſtened with this Acid is, under expoſure to air, converted into a green ſaline *Oxyd (Ærugo* P. L.)

Is more or leſs acted upon by all the Alkalis. To the ſolution of Ammoniac it communicates a beautiful blue colour, which diſappears on the excluſion, and returns on the admiſſion of air.

May be precipitated from its ſolution in Sulphuric Acid, by Arſeniate of Potaſh, *(Scheele's green Pigment)*: from Nitric Acid by Lime, *(Verditer)*: from any of its ſolutions by Iron, *(Zement Copper)*.

Detonates with melted *Nitre,* and, by the aſſiſtance of heat, decompoſes *Muriate* of *Ammoniac.*

Unites with many of the metals, and forms very important compounds, particularly with *Platina, Gold, Silver, Tin, Arſenic,* and *Zinc.*

Unites alſo, by fuſion, with *Sulphur* and with *Phoſphorus.*

The oxyds of this metal give a greeniſh tinge to *Glaſs.*

Order of attraction, in the moiſt way, *Oxalic Acid, Tartareous, Muriatic, Sulphuric, Saccho-lactic, Nitric, Sebacic, Arſenic, Phoſphoric, Succinic, Fluoric, Citric, Formic, Lactic, Acetous, Boracic, Pruſſic, Carbonic, Potaſh, Ammoniac, Unctuous Oils*; in the dry way, *Gold, Silver, Arſenic, Iron, Manganeſe, Zinc, Antimony, Platina, Tin, Lead, Nickel, Biſmuth, Cobalt, Quickſilver, Alkaline Sulphurets, Sulphur.*

Application very extenſive, employed chiefly in *Gunnery*, in the Conſtruction of *different Utenſils*, in the Compoſition of *Bell-metal* and *Alloys*, in *Enamelling, Dying, Painting* and *Medicine.*

Of Iron.

Found 1ſt. *Native*; 2d. united to a ſmall proportion of Oxygen, *Grey Iron Ore*; 3d. to Carbonic Acid, and Alumine, *Hematite*; 4th. to Oxygen, Carbonic Acid, Alumine, and often Phoſphoric Acid, *Argillaceous Iron Ores*; 5th. to Lime, Carbonic Acid and Manganeſe, *Spathoſe Iron Ore*; 6th. to Sulphuric Acid, *Native Sulphate of Iron*; 7th. to Sulphur, *Pyrites.*

As obtained from its ores, by the uſual proceſs

ceſs of reduction, aſſumes the form of *Crude Iron*, which freed from its impurities, by continued expoſure to the combined action of *Heat* and *Air*, and ſubſequent hammering or rolling, is converted into *Bar Iron.*

Colour of this *bluiſh white.* Specific gravity 7.788. *Hard, elaſtic, ductile, tenacious, magnetical.*

Ruſts eaſily on expoſure to *Air*, or application of *Moiſture* (*Rubigo Ferri* P. L.)

Is alſo, under acceſs of air, eaſily affected by *Heat*, undergoing various changes of colour from ſuperficial oxydation, long before it is ignited; but is extremely difficult of fuſion.

The only metal capable of combuſtion by *Colliſion.*

When heated ſo as to become ſoft, different portions may be united into one maſs by the operation of *Welding.*

If expoſed to *Oxygen Gas*, when ignited, burns with great brilliancy and rapidity, and is afterwards found to be *oxydated.*

The vapour of water applied to heated iron,

alſo

alſo *oxydates* it, and furniſhes *Hydrogen Gas.* (Vide page 10.)

When heated in cloſe veſſels, for a certain length of time, in contact with *Charcoal,* acquires *Weight,* becomes *fuſible,* more *brittle* and *elaſtic,* and capable of contracting a great degree of *Hardneſs,* when ignited and ſuddenly cooled, *(Steel).*

May afterwards be deprived of theſe properties by cementation with earthy infuſible powders, or the ſimple application of *Heat.*

Diſſolves more or leſs perfectly in all the *Acids.* With moſt of them, in the act of ſolution, produces *Hydrogen Gas.*

Requires the aſſiſtance of heat to decompoſe concentrated *Sulphuric Acid,* but diſſolves readily in it when diluted, and forms a pale green cryſtalliſable ſalt *(Ferrum Vitriolatum* P. L.) A ſimilar compound is obtained by the ſpontaneous decompoſition of Iron Pyrites, *(Copperas).*

With *Nitric Acid* produces either a reddiſh brown or greeniſh ſolution, which changes to a bright red on the addition of *Carbonate of Potaſh,* or *Ammoniac.*

With the *Muriatic Acid*, a yellowiſh brown ſolution, miſcible with ſpirit of wine, (*Tinctura Ferri Muriati* P. L.)

Soluble by digeſtion in the *Acetous Acid*; hence the chalybeate properties communicated by it to different kinds of wine (*Vinum Ferri* P. L.)

Alſo eaſily acted on by Acid of Tartar (*Ferrum Tartariſatum* P. L.)

By uniting with *Pruſſic Acid*, forms *Pruſſian Blue*.

In combination with *Carbonic Acid* becomes ſoluble in water; hence the properties of *Chalybeate Springs*.

With *Gallic Acid* produces a black precipitate, the baſis of common *Ink*.

Precipitates ſpontaneouſly from moſt of its acid ſolutions on expoſure to *Air*. When thrown down from theſe by an *Alkali*, may be re-diſſolved by the addition of a further portion of it.

Combines with the *Fixed Alkalis* by fuſion.

Deflagrates with *Nitrate of Potaſh*; and ſublimes with *Muriate of Ammoniac*, which it partially decompoſes (*Ferrum Ammoniacale* P. L.)

When

When in the ſtate of *Oxyd*, promotes the fuſion of ſeveral of the *Earths*, and communicates different tinges to *Glaſs*, according to the degree of *Oxydation*.

Unites by fuſion with all the other metals, except *Quickſilver*, *Lead* and *Biſmuth*. In combination with Arſenic, becomes brittle when heated, *(Red-ſhort Iron)*.

Has of all metals the ſtrongeſt attraction for *Sulphur*, with which, when heated, it unites very readily.

Is alſo capable of entering into combination with phoſphorus, *(Cold-ſhort Iron)*.

Bar-Iron, *Steel*, and *Crude Iron*, conſidered as differing from each other principally in containing different portions of *Carbon*.

Order of Attraction, in the moiſt way, *Oxalic Acid*, *Tartareous*, *Sulphuric*, *Saccho-lactic*, *Muriatic*, *Nitric*, *Sebacic*, *Phoſphoric*, *Arſenic*, *Fluoric*, *Succinic*, *Citric*, *Formic*, *Lactic*, *Acetous*, *Boracic*, *Pruſſic*, and *Carbonic*; in the dry way, *Nickel*, *Cobalt*, *Manganeſe*, *Arſenic*, *Copper*, *Gold*, *Silver*, *Tin*, *Antimony*, *Platina*, *Biſmuth*, *Lead*, *Quickſilver*, *Alkaline Sulphurets*, *Sulphur*.

Uſes too extenſive to be enumerated.

Of

Of Tin.

Found either united with oxygen and iron, *Spathoſe Tin-ore*; or with Sulphur, Copper and Iron, *Tin Pyrites.*

Colour, *white.* Specific gravity 7.291.

Soft. Malleable. Of little *tenacity.* Slightly *ſonorous. Inelaſtic.* Makes a crackling noiſe on being bent.

Tarniſhes on expoſure to *Air.*

Melts at 410 of *Farenh.* and by the continuance of the heat, with acceſs of air, is eaſily converted into a white *Oxyd,* very difficult of fuſion, the baſis of common enamel.

In its tranſition from the fluid to the ſolid ſtate, may, by agitation, be readily reduced to powder, (*Pulvis Stanni* P. L.)

Decompoſes the *Sulphuric Acid* by the aſſiſtance of heat. Is by the *Nitric Acid* immediately, without heat, converted into a white *Oxyd.*

Diſſolves readily in the *Muriatic Acid,* with effervеſcence,

effervеſcence, and forms with it a cryſtalliſable compound.

Diſſolves alſo with ſtill greater rapidity in the *Oxy-muriatic Acid* and *Aqua Regia.* Theſe ſolutions remarkable for the property of giving a bright ſcarlet colour to the infuſion of *Cochineal* and ſome other analogous ſubſtances. When united with *Oxy-muriatic Acid,* in the dry way, produces a colourleſs liquor ſtrongly diſpoſed to aſſume the gaſeous form under the common preſſure of the Atmoſphere, *Smoaking Liquor of Libavius.*

May be corroded by the continued application of the *Acetous Acid* in the form of vapour.

Capable of being acidified by a proceſs ſimilar to that uſed for the preparation of *Arſenic Acid.*

Is little affected, in the dry way, either by *Alkalis* or *Earths,* but decompoſes the compounds of the former with the *Sulphuric Acid.* Detonates rapidly with *Nitre;* and decompoſes *Muriate of Ammoniac.*

In the moiſt way, may be made to decompoſe *Nitrate of Copper* with an impetuoſity productive of actual combuſtion.

May

May be united with all the other *Metals*, and in all proportions, occaſioning in many of them an alteration in their malleability, fuſibility, ſpecific gravity, and hardneſs.

When melted with *Sulphur*, produces a dark ſtriated compound, which if prepared by ſublimation, is of a golden colour and ſpongy texture, *Aurum Muſivum.*

May alſo be combined with *Phoſphorus.*

Order of Attraction, in the moiſt way, *Sebacic Acid, Tartareous, Muriatic, Sulphuric, Oxalic, Arſenic, Phoſphoric, Nitric, Succinic, Fluoric, Saccholactic, Citric, Formic, Lactic, Acetous, Boracic, Pruſſic, Potaſh, Ammoniac*; in the dry way, *Zinc, Mercury, Copper, Antimony, Gold, Silver, Lead, Iron, Manganeſe, Nickel, Arſenic, Platina, Biſmuth, Cobalt, Alkaline Sulphurets, Sulphur.*

Employed in the compoſition of *Solder, Pewter, Bell-metal, Printer's Types*, &c. in the conſtruction of *Mirrors*, in *Tinning, Enamelling, Medicine*, &c.

The Semi-metals are, *Biſmuth, Nickel, Arſenic, Cobalt, Zinc, Antimony, Manganeſe, Tungſten, Uranite, Molybdena*, and *Manachanite.*

Of Biſmuth.

Found 1ſt. *Native*, 2d. in union with Oxygen, *Native Oxyd*, 3d. with Sulphur, *Sulphuret of Biſmuth*.

Colour, *yellowiſh white*.—Specific gravity 9.822.

But little ſubject to tarniſh. Melts at 460 *Farenh.*

In cloſe veſſels ſublimes without alteration, and in cooling cryſtallizes into cubes.

If kept in fuſion with acceſs of *Air* is converted into a greeniſh grey *Oxyd*.—Heated to redneſs burns, with a ſmall blue flame, and emits yellowiſh ſmoke, condenſible into an *Oxyd* of a ſimilar colour, *(Flowers of Biſmuth)*, which by increaſe of heat melts into a greeniſh *Glaſs*.

Diſſolves moſt readily in the *Nitric Acid*, and furniſhes a ſalt, which detonates readily when expoſed to ſudden *Heat*; and which may be decompoſed by the affuſion of *Water*, yielding a white *Oxyd*, *(Magiſtery of Biſmuth)*. It may alſo be

[illegible]

be decompoſed by the *Alkalis* and *Alkaline Sulphurets.*

The precipitate by *Sulphuret of Ammoniac* of a ſimilar appearance to that which it produces in ſolutions of *Lead.*

Deflagrates with *Nitre,* without detonation, and is converted into an *Oxyd,* which facilitates the fuſion of the *Earthy-Bodies,* and alſo of the other *metallic oxyds*; may therefore be uſed in place of *Lead* in the refinement of *Gold* and *Silver.*

Combines with moſt of the other *metallic Subſtances,* rendering them for the moſt part more fuſible.

Unites eaſily with *Sulphur* into a bluiſh-grey ſtriated compound.

Order of Attraction in the moiſt way, *Oxalic Acid, Arſenic, Tartareous, Phoſphoric, Sulphuric, Sebacic, Muriatic, Nitric, Fluoric, Saccho-lactic, Succinic, Citric, Formic, Lactic, Acetous, Pruſſic, Carbonic*; *Ammoniac*; in the dry way, *Lead, Silver, Gold, Quickſilver, Antimony, Tin, Copper, Platina, Nickel, Iron, Zinc, Alkaline Sulphurets, Sulphur.*

Uſed in the compoſition of *Pewter*, *Solder*, and *Printer's Types*, in *Aſſaying*, *Painting*, *Imitation of Silvering*, &c.

Of Nickel.

Found 1ſt. alloyed by Iron, *Native Nickel*; 2d. in combination with oxygen, *Native Oxyd*; 3d. with Iron, Arſenic, Cobalt and Sulphur, *Kupfer-Nickel.*

Difficult to obtain it pure.—Colour *reddiſh white.*—Specific gravity 7.88. *Hard*, ſomewhat *malleable*, *magnetical*. Very difficult of *fuſion*.

Yields a green *Oxyd*, which communicates an hyacinthine tinge to *Glaſs*.

All its ſolutions of a green colour; that in the *Nitric Acid*, (in which it diſſolves moſt readily) affords rhombic cryſtals, and like the others changes to a blue on the addition of *Ammoniac*.

Detonates, like moſt other metals, with *Nitre*.

Unites by fuſion both with *Arſenic* and *Cobalt*. Unites alſo by fuſion with *Sulphur*.

Order of attraction, in the moiſt way, *Oxalic Acid*,

Acid, Muriatic, Sulphuric, Tartareous, Nitric, Sebacic, Phoſphoric, Fluoric, Saccho-lactic, Succinic, Citric, Formic, Lactic, Acetous, Arſenic, Boracic, Pruſſic, Carbonic, Ammoniac; in the dry way, *Iron, Cobalt, Arſenic, Copper, Gold, Tin, Antimony, Platina, Biſmuth, Lead, Silver, Zinc, Alkaline Sulphurets, Sulphur.*

This metallic ſubſtance not as yet applied to any uſe.

Of Arſenic.

Found 1ſt. alloyed by Iron, *Native Arſenic*; 2d. combined with Oxygen, *Native Oxyd*; 3d. with different proportions of Sulphur, *Realgar, Orpiment*; and 4th. with Sulphur, Iron and ſometimes Silver, *Miſpickel.*

Colour, *ſteel-grey.* Texture, *ſcaly.* Specific gravity 5.76. Much diſpoſed to tarniſh.

Volatile in cloſe veſſels at 356 of *Farenh.*

If expoſed to *Air* under the heat of ignition, burns with a blue flame, and is converted into a white *Oxyd (Common white Arſenic.)*

This ſoluble in about 15 times its weight of boiling water.—Taſte, *cauſtic.*—Leſs volatile than the *Regulus.*—Emits a garlic ſmell on the application of *Heat.*—*Vitreſcible.*—Promotes the fuſion of *Earthy Bodies.* When melted with *Sulphur*, produces different ſhades of colour, according to the degree of *Heat*; hence artificial *Orpiment* and *Realgar.*—By treatment with the *Nitric Acid*, becomes more completely *oxygenated*, (vide page 23).—Decompoſes *Nitre* in the dry way, producing a neutral cryſtalliſable ſalt, *Arſenical Salt of Macquer.*—If diſtilled with unctuous matter, reaſſumes the form of *Regulus.*

In its *metallic* ſtate, decompoſes moſt of the mineral acids; the *nitric* moſt readily.

Unites with moſt of the other *Metals*; rendering brittle thoſe which are ductile, and in a remarkable manner increaſing the fuſibility of ſome, and diminiſhing that of others.

To the red and yellowiſh metals communicates a ſilvery whiteneſs.

Soluble in *Alkaline Sulphurets.* Soluble alſo in *Unctuous Oils*, with which it forms a conſiſtent mixture.

Moſt

Moſt of the preparations of this metal in a high degree *noxious*, when ignorantly adminiſtered; the detection of their preſence therefore often of great moment.

Order of attraction, in the moiſt way, *Muriatic Acid*, *Oxalic*, *Sulphuric*, *Nitric*, *Sebacic*, *Tartareous*, *Phoſphoric*, *Fluoric*, *Saccho-lactic*, *Succinic*, *Citric*, *Formic*, *Lactic*, *Arſenic*, *Acetous* and *Pruſſic*, *Ammoniac*, *Unctuous Oils*, *Water*; in the dry way, *Nickel*, *Cobalt*, *Copper*, *Iron*, *Silver*, *Tin*, *Lead*, *Gold*, *Platina*, *Zinc*, *Antimony*, *Alkaline Sulphurets*, *Sulphur*.

Uſed principally in *Glaſs-making*, *Painting*, and *Medicine*.

Of Cobalt.

Found 1ſt. alloyed with Arſenic, *Grey Cobalt Ore*; 2d. united to Oxygen, *Native Oxyd*; 3d. to Arſenic Acid, *Cobalt Bloom*; 4th to Sulphur, *Sulphuret of Cobalt*; and 5th. to Arſenic, Iron, and Sulphur, *White Cobalt Ore*.

Colour, *light grey*. Specific gravity 7,811. *Compact*, *brittle*.

Fuſes with difficulty. When heated in contact with air, yields a browniſh Oxyd, *Zaffre,* which fuſed with Silex produces a blue glaſs, *Smalt.*

Diſſolves with more or leſs facility in ſeveral acids; moſt eaſily in the *Nitric Acid.*

With the Muriatic and Oxy-muriatic Acids forms compounds, the reddiſh ſolutions of which, as often as expoſed to heat, change to a beautiful green, *Sympathetic Ink.*

Detonates feebly with *Nitre.*

Unites by fuſion with moſt of the other *Metals.*

Combines difficultly with *Sulphur*; more readily with *Alkaline Sulphurets.*

Its *Oxyd* ſoluble in *Ammoniac.*

Order of Attraction, in the moiſt way, *Oxalic Acid, Muriatic, Sulphuric, Tartareous, Nitric, Sebacic, Phoſphoric, Fluoric, Saccho-lactic, Succinic, Citric, Formic, Lactic, Acetous, Arſenic, Boracic, Pruſſic, Carbonic, Ammoniac*; in the dry way, *Iron, Nickel, Arſenic, Copper, Gold, Platina, Tin, Antimony, Zinc, Alkaline Sulphurets, Sulphur.*

Uſed to colour *Glaſs*, in *Glazing*, *Enamelling*, *Painting*, *Waſhing*, &c.

Of Zinc.

Found 1ſt. in combination with Oxygen, Oxyd of Iron, Silex, and Alumine, *Calamine*; 2d. with Carbonic Acid, Water, Silex and Iron, *Carbonate of Zinc*; and 3d. with Sulphuric Acid and Water, *Sulphate of Zinc.*

Requires for its reduction to be treated in cloſe veſſels.

Colour, *bluiſh-white.* Specific gravity 7,190.

Somewhat *malleable.* Texture *laminated.*

When heated is eaſily pulveriſed; and like iron is capable of decompoſing *Water.* Melts at about 700 of *Farenh.*

In contact with air, burns ſoon after ignition, with a brilliant flame, and furniſhes a white flocculent *Oxyd* (*Flores Zinci* P. L.), convertible by an increaſe of heat into a yellowiſh *Glaſs*.

Is readily acted on by Acids. During its ſolution in the *Sulphuric* and *Muriatic Acids*, *Hy-*

drogen Gas is evolved. Produces with the former Acid, a ſtyptic cryſtalliſable ſalt.

May be precipitated from its ſolutions by *Earths* and *Alkalis*.

Decompoſes, in the dry way, *Sulphate of Potaſh* and many other compounded ſalts. Detonates violently with *Nitre*. By ſimple trituration decompoſes *Muriate of Ammoniac*. Is alſo capable of precipitating *Alum*, in the moiſt way.

Unites with all the other metallic ſubſtances except *Biſmuth*; giving to *Copper* additional elaſticity, durability, and hardneſs.

In its *metallic form* cannot be combined with *Sulphur*; but when *oxydated* unites readily with it.

Order of Attraction, in the moiſt way, *Oxalic Acid, Sulphuric, Muriatic, Saccho-lactic, Nitric, Sebacic, Tartareous, Phoſphoric, Citric, Succinic, Fluoric, Arſenic, Formic, Lactic, Acetous, Boracic, Pruſſic* and *Carbonic, Ammoniac*; in the dry way, *Copper, Antimony, Tin, Quickſilver, Silver, Gold, Cobalt, Arſenic, Platina, Biſmuth, Lead, Nickel, Iron.*

Of Antimony.

Found 1ſt. *Native*; 2d. alloyed with Arſenic, *Native Arſenical Antimony*; 3d. in union with Oxygen, *Native Oxyd*; 4th. with Muriatic Acid, *Muriate of Antimony*; 5th. with Arſenic Acid and Sulphur, *Red Antimonial Ore*; 6th. with Sulphur only, *Grey Antimonial Ore*; and 7th. with Iron, Arſenic, Sulphur, and ſometimes Silver, *Plumoſe Antimonial Ore.*

Colour *ſilvery white.* Specific gravity 6.702. Texture *laminated. Very brittle.*

Melts ſoon after ignition. Is volatile in cloſe veſſels. When heated in contact with *Air*, is converted into a light white *Oxyd*, *Argentine Flowers of Antimony*, which are ſoluble in *Water*, and fuſible into an Hyacinthine *Glaſs*.

Decompoſes both the *Sulphuric* and *Nitric Acids*, the former with, the latter without, the aſſiſtance of *Heat.* Requires digeſtion for its ſolution in the *Muriatic Acid*; but in the *Oxymuriatic* diſſolves with great facility.

Decompoſes, in the dry way, moſt of the ſaline compounds of the *Sulphuric Acid.* Detonates readily with *Nitre*; and decompoſes *Muriate of Quickſilver.*

Combines with moſt other *Metals.*

Unites with *Sulphur* in all proportions, and forms with it a grey ſtriated compound, *Antimony* of the ſhops.

This when expoſed for a continuance to low heat, yields a grey *Oxyd*, which by fuſion is converted into a yellowiſh *Glaſs* (*Vitrum Antimonii* P. E.)

If roaſted with *Hartſhorn*, and afterwards ignited, yields a white *Oxyd*, (*Pulvis Antimonialis* P. L. *Antimonium Calcareo-Phoſphoratum* P. E).

When deflagrated with *Nitre*, is more or leſs decompoſed according to the degree of combuſtion, (*Antimonium Calcinatum* P. L. *Antimonium uſtum cum Nitro* P. E. *Crocus Antimonii* P. L. and P. E.)

Reduced to powder and boiled in a ſolution of *Potaſh*, depoſits, on cooling, an orange coloured precipitate *Kermes Mineralis Ph. Suec.*); on the addition of the Sulphuric Acid to the ſolution whilſt hot, a browniſh red precipitate, (*Sulphur Antimonii præcipitatum* P. L. and P. E.)

A mixture

A mixture of *Crocus* of *Antimony* and *common Salt*, with the addition of *Sulphuric Acid*, produces, by diſtillation, a butyraceous compound (*Antimonium Muriatum* P. L. and P. E.), which on the affuſion of common water, or by the addition of Potaſh, furniſhes a white oxyd; *Powder of Algaroth*. The combination of this with acidulous Tartrite of Potaſh, forms a triple ſalt, (*Antimonium Tartariſatum* P. E.) Other Antimonial *Oxyds* give a ſimilar preparation, (*Antimonium Tartariſatum* P. L.)

Order of Attraction, in the moiſt way, *Sebacic Acid*, *Muriatic*, *Oxalic*, *Sulphuric*, *Nitric*, *Tartareous*, *Saccho-lactic*, *Phoſphoric*, *Citric*, *Succinic*, *Fluoric*, *Arſenic*, *Formic*, *Lactic*, *Acetous*, *Boracic*, *Pruſſic* and *Carbonic*; in the dry way, *Iron*, *Copper*, *Tin*, *Lead*, *Nickel*, *Silver*, *Biſmuth*, *Zinc*, *Gold*, *Platina*, *Quickſilver*, *Arſenic*, *Cobalt*, *Alkaline Sulphurets*, *Sulphur*.

Uſed in the compoſition of *Types*, in *Medicine*, &c.

Of Manganeſe.

Found, 1ſt. *Native*; 2d. in union with Oxygen, *Native Oxyd*; and 3d. with Oxygen, Silex, Iron, and Alumine, *Siliceous Manganeſe.*

Colour, *dull white.* Texture *granular.* Specific gravity 6.850. *Hard. Brittle.*

Extremely difficult to fuſe; but very eaſily *oxydated.*

Soluble in the diluted *Sulphuric*, in the *Nitric*, *Muriatic*, and ſeveral other acids.

In the ſtate of *Oxyd*, occaſions in the *Muriatic Acid* a ſtriking change of properties, by imparting to it a portion of its *Oxygen.* Vide page 18.

Its action on the *Alkalis* not yet aſcertained.

When oxydated, decompoſes both *Nitrate of Potaſh* and *Muriate of Ammoniac*, in the dry way.

In this ſtate, unites by fuſion with the *Earthy Bodies*, and when added to *Glaſs*, either renders it colourleſs or communicates a violet tinge, according to the degree of *Oxydation.*

Unites alſo, by fuſion, with *Sulphur*, into a yel-

lowiſh

lowiſh-green maſs. By mixture with unctuous ſubſtances ſometimes occaſions *Inflammation.*

Combines in the metallic ſtate with moſt of the other *Metals,* rendering *Gold* and *Iron* more fuſible, *Copper* leſs.

Order of Attraction, in the moiſt way, *Oxalic Acid, Citric, Phoſphoric, Tartareous, Fluoric, Muriatic, Sulphuric, Nitric, Saccho-lactic, Succinic, Sebacic, Arſenic, Formic, Lactic, Acetous, Pruſſic* and *Carbonic*; in the dry way, *Copper, Iron, Gold, Silver, Tin, Alkaline Sulphurets.*

Employed principally in *Glaſs-making* and *Bleaching.*

Of Tungſten.

Found in an acid form in combination with Lime, *Tungſtate of Lime*; and 2d. with Oxyd of Manganeſe and of Iron, Silex, and Tin, *Wolfram.*

Colour *ſteel grey.* Texture *granular.* Specific gravity 17.6.

Nearly *infuſible.*

Yields

Yields a yellow *Oxyd.*

Inſoluble in the *Sulphuric*, *Nitric*, *Muriatic*, and *Oxy-muriatic Acids.*

Combines with the other *Metals.* Does not leſſen the ductility of *Silver* or *Copper*; but renders *Iron*, *Tin*, *Biſmuth*, *Antimony*, and *Manganeſe* harder.

Order of Attraction, in the moiſt way, *Lime*, *Potaſh*, *Ammoniac*; in the dry way, *Potaſh*, *Lime*, *Iron*, *Manganeſe.*

Not as yet applied to any uſe.

Of Uranite.

Found 1ſt. united to Carbonic Acid and a little Copper, *Calcolite*; and 2d. to Sulphur, *Pich Blende.*

Has not as yet been perfectly *metalliſed.*

Of Molybdena.

Found in an acid form in combination with *Sulphur.*

Colour *grey*. Specific gravity not aſcertained. *Brittle.*

Leſs fuſible than either *Platina* or *Manganeſe.*

Yields a white *oxyd* when heated in contact with *Air*, or digeſted in *Nitric Acid*, or deflagrated with *Nitre*.

When combined with *Iron*, *Copper*, and *Silver*, renders them friable.

In union with *Sulphur* regenerates *Sulphuret of Molybdena.*

Order of Attraction unknown.

Not yet applied to any uſe.

Of Manachanite.

Found either amorphous, or in grains of a *grey* colour, *ponderous* and attractable by the *Magnet.*

Suppoſed to contain a *Metal* of a particular kind.

OF INFLAMMABLE SUBSTANCES.

Theſe; ſuch as are more eſpecially remarkable for exhibiting the phenomenon of *Combuſtion*, when heated to a certain degree in contact with *Air*.

The changes produced on the *Air* in this proceſs, and the alteration which the *inflammable Subſtances* themſelves undergo, already particularly treated of. Vide page 7.

In their *Form*, *Conſiſtence*, *Weight*, *Volatility*, &c. the ſubſtances of this claſs differ widely from each other. They are comparatively *lighter* than moſt other bodies.

The principal mineral inflammable ſubſtances are, *Hydrogen Gas*, (vide page 11.) *Bituminous Bodies*, *Amber*, *Sulphur*, *Plumbago*, and the *Diamond*.

Of Bituminous Bodies.

Found either liquid and devoid of colour, *Naphtha*; or more or leſs liquid and of a dark colour, *Petroleum*, *Barbadoes Tar*; or ſolid, black, and

and of a compact or ſlaty texture, *Aſphaltum*, *Jet*, *Coal.*

The principle of *Inflammability* apparently the ſame in all, the more liquid being, by continued expoſure to *Air*, convertible into the more conſiſtent, and all yielding ſimilar products in diſtillation. In the different kinds of *Coal* there exiſts more or leſs *earthy* admixture, and often *Iron Pyrites.*

The *bituminous* bodies immiſcible with *Water* and inſoluble in *Spirit of Wine.*

They appear from a variety of circumſtances to be of *vegetable* origin.

Of Amber.

Found for the moſt part in irregular maſſes more or leſs tranſparent, and of a browniſh or yellowiſh colour.—Specific gravity from 1.055 to 1.000. Emits a peculiar odour on friction and becomes *electric.* Melts at 550 *Farenheit.* Burns with a whitiſh flame. In diſtillation yields *Water*, *Empyreumatic Oil*, (*Oleum Succini* P. L.) and a concrete *Acid*, (*Sal Succini* P. L.) Vide page 22.

Inſoluble in *Water* and nearly ſo in *Spirit of Wine*, alſo in all the acids, the *Sulphuric Acid* excepted, in the ſolutions of the *Alkalis*, and in *eſſential* and *expreſſed Oils*; but the *Balſams* diſſolve it readily.

Of the methods uſually employed for rendering *Amber* tranſparent.

This ſubſtance alſo, probably of *vegetable* origin.

Of Sulphur.

Found either uncombined, or depoſited by water, or ſublimed by ſubterranean fire, *Native Sulphur*; or in combination with other bodies, more eſpecially with different *Metals*.

May be obtained artificially by the decompoſition of *Sulphuric Acid*.

Colour, *pale Yellow*.—Specific gravity 2.033. *Hard*, *brittle*, *inſipid*, *inſoluble*. Very eaſily melted. Sublimes in cloſe veſſels into light yellow flowers; (*Flores Sulphuris* P. L.)

Burns with a blue flame, and by abſorbing *Oxygen* from the Air, is converted into *Sulphure-*

ous Acid Gas, *Sulphureous* or *Sulphuric Acid*, according to the proportion of this principle.—Similar effects are produced on it by deflagration with *Nitre*.

Is little affected by *Acids*.

Unites readily with the *Alkalis*, and alſo with the *ſaline Earths*, producing liver-coloured compounds (*Sulphuret of Potaſh*, *&c.*) which are ſoluble in *Water*, and may be decompoſed by all the *Acids* (*Sulphur præcipitatum* P. L.).

When intimately mixed with certain proportions of *Potaſh* and *Nitre*, produces a compound which when gradually expoſed to heat explodes with great violence (*Pulvis fulminans*).

With *Nitre* and *Charcoal*, in mixture, it conſtitutes *common Gunpowder*.

Combines by fuſion with all the metals except *Platina*, *Gold*, and *Zinc*.

Is inſoluble in *Spirit of Wine*, but unites with *oily* matter of every kind, and with all the liquid *bituminous* bodies, into compounds of increaſed conſiſtence (*Balſams of Sulphur*).

Order of Attraction; in the moiſt way, *Lead*, *Tin, Silver, Quickſilver, Arſenic, Antimony, Iron, Potaſh, Ammoniac, Baryt, Lime, Magneſia, unctuous Oils, eſſential Oils, Æther, Spirit*; in the dry way, *Potaſh, Soda, Iron, Copper, Tin, Lead, Silver, Cobalt, Nickel, Biſmuth, Antimony, Quickſilver, Arſenic.*

Employed principally in *Bleaching*, in the manufacture of *Sulphuric Acid*, and of *Gunpowder*, frequently alſo in *Medicine.*

Of Plumbago.

Found in different parts of the world, of different degrees of purity.

Colour, *blackiſh-blue.*—Feel, *unctuous.* Texture, *granular* or *compact.*—Specific gravity 2.00.

Inſoluble in *Water*, and unalterable on expoſure to *Air.*

When ignited in contact with this fluid, undergoes *ſlow Combuſtion*, leaving behind only a ſmall portion of *Oxyd* of *Iron.*

In cloſe veſſels it ſuffers no change.

It decompoſes *Sulphuric Acid* by the aſſiſtance of

of heat, but is inſoluble either in the *Nitric* or *Muriatic Acid*, yet diſſolves in the *Oxy-muriatic Acid*, and on deflagration with *Nitre*, produces *Corbonate* of *Potaſh*.

From theſe and other circumſtances, conſidered as analogous to *Charcoal*.

Uſed in the manufacture of *Pencils*, *Razor-ſtrops*, *Crucibles* and other chemical veſſels, in poliſhing *Shot*, defending the ſurface of *Iron* from ruſt, leſſening the friction in mill-work, &c.

Of the Diamond.

Found principally in certain parts of India, in cryſtals of different colours and ſizes.

Figure of its cryſtals *octohedral*. Specific gravity, 3.521. Hardneſs greater than that of any other body.

Aſcertained, by various experiments, to be capable of *Combuſtion*, but only in the moſt intenſe heats.

The *Sulphuric Acid* the only menſtruum that has any effect on this gem.

Valued chiefly on account of its *Splendour* and *Durability.*

The principal vegetable inflammable ſubſtances are, *Alcohol, Eſſential Oils, Balſams, Reſins, Expreſſed Oils, Camphor, Charcoal.*

Of Spirit of Wine (Alcohol).

Obtained from ſuch ſubſtances as have undergone the *Vinous Fermentation,* of which thoſe containing *ſaccharine Matter* are alone ſuſceptible. This proceſs materially influenced by *Reſt, Dilution, Temperature,* and *Expoſure to Air.*

Repeated diſtillation and digeſtion on *Potaſh,* neceſſary to bring this fluid to its ultimate degree of purity.

When pure *colourleſs* and *tranſparent.*

Taſte *hot* and *pungent.* Specific gravity 0.817.

Miſcible with *Water* in all proportions.

Burns with a bluiſh flame, producing in combuſtion *Carbonic Acid Gas* and *Water.*

Undergoes

Undergoes ſingular changes in its properties by treatment with the different *Acids*; hence the preparation of *Æthers*, *Oleum Vini*, &c.

Diſſolves the *Alkalis*, and many of the *compounded neutral Salts*, particularly ſuch as are deliqueſcent. Alſo diſſolves *Soap*, and acts readily as a ſolvent on *Eſſential-Oils* and *Reſins*, on *Balſams* and on *Camphor*; hence the preparation of various *Spirituous Liquors*, *Tinctures*, *Varniſhes*, &c.

Conſidered by *Mr. Lavoiſier* and others, as a compound of *Hydrogen*, *Carbon*, and *Oxygen*, produced by the decompoſition of the ſugar, in the act of *Fermentation*.

Order of Attraction, *Water*, *Æther*, *Eſſential Oils*, *Ammoniac*, *Potaſh*, *Alkaline Sulphurets*, *Sulphur*.

In general uſe for various *technical* as well as *dietetical* and *medical* purpoſes.

Of Eſſential Oils.

Obtained from moſt fragrant vegetables, by expreſſion, or diſtillation with *Water*.

Taſte *pungent.* Odour, colour, and conſiſtence, *various.* Moſt of them lighter, ſome few heavier than *Water.*

Thicken and become inodorous when expoſed to *Air.*

Sparingly ſoluble in *Water*; but readily ſo in *Spirit.*

Volatile in cloſe veſſels, without decompoſition, but highly *inflammable* when heated in contact with *Air.*

Decompoſe the ſtronger *Acids*; in ſome inſtances with ſuch rapidity as to occaſion actual *Combuſtion.*

May be united with the *Alkalis* and *Lime* ſo as to form *Soaps.*

Combine intimately with *Sulphur.*

Combine alſo with *Phoſphorus, Unctuous Oils,* and *Camphor.*

Purity aſcertained by ſolution in *Spirit,* or expoſure to *Heat.*

Nature of their compoſition not yet thoroughly inveſtigated; but ſuppoſed to be compounds of *Carbon* and *Hydrogen.*

Of *Balſams* and *Reſins.*

Theſe alſo vegetable products, differing from each other principally in reſpect to conſiſtence.

In moſt of their properties, they are analogous to the foregoing, which aſſume theſe forms when combined with different portions of *Oxygen.*

Of theſe and the *Eſſential Oils* the uſes various.

Of *Unctuous Oils.*

Obtained, ſometimes by boiling, but moſtly by preſſure, from certain *Fruits, Kernels, Pippins,* and *emulſive Seeds.*

Inſipid. Inodorous. Unctuous. Colour and conſiſtence various. Specifically lighter than *Water.*

Inſoluble both in *Water* and *Spirit.*

Become rancid and more conſiſtent, on expoſure to *Air,* apparently by the abſorption of *Oxygen.*

Yield, by diſtillation in cloſe veſſels, an acid

Phlegm, a lighter and a denſer *Oil*, a large quantity of *Hydrogen Gas* mixed with *Carbonic Acid Gas*, and leave behind a ſmall proportion of *Charcoal.*

Afford *Water* and *Carbonic Acid Gas* by inflammation in contact with *Air.*

By mixture with the ſtronger *Acids*, produce, in ſome inſtances, *ſaponaceous Compounds*; in others, occaſion *Combuſtion.*

Unite more perfectly with the *Alkalis*, more eſpecially with *Potaſh* and *Soda*; with the latter, form common *Soap.*

Unite alſo into ſaponaceous compounds with *Baryt*, *Lime*, and *Magneſia.*

Have no action on any of the *Metals* except *Copper* and *Iron*, but aſſiſted by heat diſſolve moſt of the *metallic Oxyds*, and when ſeparated again from theſe, are found to be ſoluble in ſpirit of wine.

Form with *Sulphur* a browniſh red fluid of a diſagreeable ſmell (*Balſamum Sulphuris* P. L.) Combine alſo by the aſſiſtance of heat, with moſt of the *Bituminous Bodies.*

Conſidered as differing principally from the *Eſſential Oils*, in containing different portions of *Mucilage.*

Employed

Employed in *Painting*, *Varniſhing*, *Soap-making*, in *Mechanics*, for *Fuel*, in *Diet*, *Medicine*, &c.

Of Camphor.

Obtained by diſtillation with water, from a particular ſpecies of laurel, *(Laur. Camph. Lin.)* and ſome other vegetables.

Requires the addition of a ſmall quantity of *Lime*, in its ſubſequent refinement by ſublimation.

White. *Tranſparent*. *Friable*. Taſte *pungent* and *bitteriſh*. Specifically lighter than *Water*.

Evaporates completely if kept expoſed to the air.

Burns with a white flame, and is entirely conſumed.

Sparingly ſoluble in *Water*; but readily ſo in *Spirit of Wine*, and *Æthers*, in *Unctuous* and *Eſſential Oils*.

Diſſolves both in the *Sulphuric* and *Nitric Acid*, without decompoſition; by repeated diſtillation with the latter, is converted into a peculiar *Acid*. Vide page 36.

Chiefly employed in medicine.

Of Charcoal.

Obtained from *Vegetable*, *Animal*, and *Bituminous* ſubſtances, by incomplete combuſtion, or by the application of heat in cloſe veſſels.

Varies in its form, quantity, and purity, according to the nature of the ſubſtance from which it is prepared.

The charcoal of common wood, *black*, *light*, *brittle*, *ſonorous*, *inſipid*, *inodorous*, and of great *durability*.

Capable of ſuſtaining the moſt intenſe degrees of *Heat* in cloſe veſſels, without alteration; but upon acceſs of *Air*, burns with a white flame, and yields *Carbonic Acid Gas*, leaving behind a ſmall quantity of *earthy ſaline Aſhes*.

Decompoſes the *Sulphuric Acid* and all its compounds, by the aſſiſtance of *Heat*.

Decompoſes alſo the *Nitric Acid* without *Heat*, and ſometimes with ſuch rapidity as to occaſion *Combuſtion*. Detonates with *Nitre*.

Diſſolves, by fuſion, in the *fixed Alkalis*; very readily alſo in *Alkaline Sulphurets*.

Poſſeſſes the remarkable property of correcting *Fœtor*, and of depriving many ſubſtances of *Colour*, eſpecially when uſed in its freſh-burnt ſtate.

Uſed chiefly as an article of *Fuel* for culinary purpoſes, and in certain arts, trades, and manufactures.

The principal animal inflammable ſubſtances are *Fat*, *Butter*, *Bees-wax*, *Sperma-ceti*, and *Phoſphorus*.

Of Fat.

Found in the adipoſe membrane of animals, of different colours and conſiſtence according to the part, the age, and the ſpecies, of the animal from which it is obtained.

When freſh, *unctuous*, *inſipid*, *inodorous*. *Inſoluble* both in *Water* and *Spirit* of *Wine*.

Becomes rancid by keeping.

Liquifies in a moderate heat, and congeals by cooling.

Yields by diſtillation in a water-bath, an *Aqueous Liquor*, which contains *Mucus*, and is much diſpoſed to become putrid. By ſimple diſtillation

tion affords a peculiar *Acid* (vide page 41), an *Oil* partly liquid and partly concrete, and leaves a ſmall proportion of *Charcoal.*

Burns readily in contact with *Air.*

Forms ſaponaceous compounds with the ſtronger *Acids*, *Alkalis*, and *Lime.*

Acts on *Lead*, *Copper*, and *Iron*, in their metallic form, and on the *Oxyds* of theſe and moſt of the other *Metals.*

Combines in all proportions, as well with the *Eſſential* as with the *Unctuous Oils.*

Combines alſo intimately with *Sulphur.*

Conſidered as differing from *Unctuous Oils*, principally, in the peculiar *Acid* which it yields.

Uſes nearly the ſame.

Of Butter.

Collected from milk after the ſpontaneous ſeparation of its conſtituent parts.

Differs in no material reſpect from the foregoing, either in its properties or uſes.

Of

Of Bees-Wax.

Depoſited by the *Bee* in the conſtruction of the *Honey-comb.* Colour *yellow.* Taſte *inſipid.* Inſoluble in *Water.*

Becomes white on expoſure to *Air*, or treatment with the *Oxy-muriatic Acid.*

Yields in diſtillation an *acid Phlegm*, a *Butyraceous Oil*, and a ſmall quantity of *Charcoal.*

Unites with the *Alkalis* and forms *Soap.*

Combines in all proportions with *Oils*, *Reſins*, and *Fat*; hence the preparation of ſeveral *Cerates*, *Ointments*, and *Plaiſters.*

Employed alſo in ſeveral of the arts, but principally in making *Wax candles.*

Of Sperma-ceti.

Obtained from the brain of a particular ſpecies of whale, (*Cetus dentatus Lin.*) thence called the Sperma-ceti whale; obtained alſo in ſmall quantity from the oil of the ſame fiſh.

After

After refinement, *white, ſemitranſparent, cryſtalline, friable, inſipid, inodorous, inſoluble* in *Water.*

Changes colour and becomes rancid by keeping.

Little altered by diſtillation, nor eaſily acted upon by *Acids* or *Alkalis.*

Combines in all proportions with *Sulphur*; alſo with *Unctuous* and *Eſſential Oils, Reſins* and *Animal Fat,* like the foregoing.

Suppoſed to have the ſame relation to *Unctuous Oils* that *Camphor* has to the *Eſſential.*

Uſed chiefly for making Sperma-ceti candles, and in the compoſition of *Ointments, Plaiſters,* &c.

Of Phoſphorus.

Obtained, by decompoſing calcined *Bones* by means of diluted *Sulphuric Acid,* evaporating the ſupernatant liquor to the conſiſtence of a ſyrup, mixing it with powdered *Charcoal,* and diſtilling in the open fire; or by adding *Nitrate* or *Acetite* of

Lead to common *Urine*, collecting the precipitate, mixing this with *Charcoal* and diſtilling as above.

Purified by cautious re-diſtillation, or ſtraining it, when melted, through leather.

Colour *pearly-white*. *Semitranſparent*. *Waxy*. *Inſoluble* in *Water*. Very *fuſible*.

When expoſed to air, at a low temperature, emits a white fume, and is luminous in the dark; if heated, burns with great rapidity; and in both caſes acquires acid properties. Vide page 37.

Decompoſes the *Nitric Acid*, occaſioning combuſtion by the ſudden ſeparation of its *Oxygen*.

By treatment with the *fixed Alkalis* or *Lime*, yields a permanently elaſtic fluid, which explodes on admiſſion of *Air (Phoſphoric Gas)*.

Diſſolves in *Eſſential* and *Unctuous Oils*, *Spirit* of *Wine*, and *Æthers*.

Unites by fuſion with *Sulphur*.

Unites alſo with ſeveral of the *Metals*, and decompoſes moſt of their *Oxyds*.

Uſed only in the preparation of *liquid Phoſphorus*, *Phoſphoric Matches*, and portable *Phoſphoric Bottles.*

OF SPONTANEOUS ANALYSIS.

(*Fermentation.*)

Organiſed bodies, or their products, alone capable of becoming the ſubjects of this *Analyſis.*

Takes place under particular circumſtances of *Temperature*, *Humidity*, *Accumulation*, and *Expoſure to Air.*

Diviſible into different ſtages; the *Vinous*, productive of *Alcohol*; the *Acetous*, affording *Vinegar*; and, the *Putrid*, generating *Ammoniac.*

Theſe changes may be promoted or retarded by various means. *Ferments.*

OF THE ANALYSIS OF MINERAL WATERS.

Firſtly, by *Teſts* or *Re-agents.*

Secondly, by *Diſtillation* and ſubſequent examination of their *gaſeous* and *ſolid* contents.

THE END.

276

CHEMICAL NOMENCLATURE.

TAB. I.

	SIMPLE BODIES		—— RENDERED INTO GAS BY CALORIC.		—— COMBINED WITH OXYGEN.		—— GASEOUS OXYGENATED.		—— OXYGENATED WITH BASES.		—— COMBINED, BUT NOT RENDERED ACID.	
	NEW NAMES.	FORMER NAMES.	*NEW NAMES.*	FORMER NAMES.	*NEW NAMES.*	FORMER NAMES.	*NEW NAMES.*	FORMER NAMES.	*NEW NAMES.*	FORMER NAMES.	*NEW NAMES.*	FORMER NAMES.
	Light.											
	Caloric.	*Matter of heat.*										
	Oxygen.	*Baſe of vital air.*	Oxygen gas.	*Dephlogiſticated air.*								
	Hydrogen.	*Baſe of inflammable air.*	Hydrogen gas.	*Inflammable air.*	Water.	*Water.*						
ACIDIFIABLE BASES.	Azote, *or* Nitric radical.	*Baſe of phlogiſticated air.*	Azotic gas.	*Phlogiſticated air.*	Baſe of nitrous gas. Nitric, and nitrous acid.	*Baſe of nitrous air.* *Dephlogiſticated and phlogiſticated nitrous acid.*	Nitrous gas. Nitrous acid gas.		Nitrate of potaſh. Nitrate of ſoda, &c. Nitrite of potaſh, &c.	*Common nitre.* *Cubic nitre,* &c.	Ammoniac.	
	Carbon, *or* Carbonic radical.	*Pure charcoal.*			Carbonic acid.	*Fixed air.*	Carbonic acid gas.	*Fixed air,* or *aërial acid.*	Carbonate of lime, potaſh, iron, &c.	*Mild calcareous earth, mild alkali,* &c.	Carburet of iron.	*Plumbago.*
	Sulphur, *or* Sulphuric radical.				Sulphuric acid. Sulphureous acid.	*Vitriolic acid.* *Volatile vitriolic acid.*	Sulphureous acid gas.	*Sulphureous acid gas.*	Sulphate of potaſh, &c. Sulphite of potaſh, &c.	*Vitriolated tartar,* &c. *Stahl's ſulphureous ſalt,* &c.	Sulphuret of iron, antimony, &c. Sulphurated hydrogen gas. Sulphurate of potaſh, ſoda, &c.	*Iron pyrites, common antimony,* &c. *Hepatic gas.* *Alkaline hepars.*
	Phoſphorus, *or* Phoſphoric radical.				Phoſphoric acid. Phoſphorous acid.	*Phoſphoric acid.* *Volatile phoſphoric acid.*			Phoſphate of potaſh, ſoda, &c. Phoſphite of potaſh, ſoda, &c.	*Phoſphorated kali, ſoda,* &c.	Phoſphorized hydrogen gas. Phoſphuret of iron.	*Phoſphoric gas.* *Syderite.*
	Muriatic radical.				Muriatic acid. Oxy-muriatic acid.	*Marine acid.* *Dephlogiſticated marine acid.*	Muriatic acid gas. Oxy-muriatic acid gas.	*Marine acid gas.* *Dephlogiſticated marine acid gas.*	Muriate of potaſh, ſoda, &c. Oxy-muriate of potaſh, &c.	*Salt of ſylvius, Common ſalt,* &c.		
	Boracic radical.				Boracic acid.	*Sedative ſalt.*			Borate of potaſh, ſoda, &c.	*Vegetable borax, Common borax,* &c.		
	Fluoric radical.				Fluoric acid.	*Spathic acid.*	Fluoric acid gas.	*Spathic acid gas.*	Fluate of lime, &c.	*Fluor ſpar,* &c.		
	Succinic radical.				Succinic acid.	*Salt of amber.*			Succinate of potaſh, &c.			
	Acetic radical.				Acetous acid. Acetic acid.	*Diſtilled vinegar.* *Radical vinegar.*			Acetite of potaſh, ammonia, lead, &c. Acetate of potaſh, &c.	*Diuretic ſalt.* *Mindererus ſpirit.* *Sugar of lead,* &c.		
	Tartaric radical.				Tartareous acid.				Acidulous tartrite of potaſh. Tartrite of potaſh. Tartrite of ſoda.	*Cream of tartar.* *Soluble tartar.* *Rochelle ſalt.*		
	Pyro-tartaric radical.				Pyro-tartareous acid.	*Empyreumatic acid of tartar.*			Pyro-tartrite of potaſh, &c.			
	Oxalic radical.				Oxalic acid.	*Acid of ſugar.*			Acidulous oxalate of potaſh. Oxalate of ſoda, lime, &c.	*Salt of ſorrel.*		
	Gallic radical.				Gallic acid.	*Acid of galls.* *Aſtringent principle.*			Gallates of potaſh, lime, iron, &c.			
	Citric radical.				Citric acid.	*Acid of lemons.*			Citrate of potaſh, lime, &c.			
	Malic radical.				Malic acid.	*Acid of apples.*			Malate of potaſh, &c.			
	Benzoic radical.				Benzoic acid.	*Acid,* or *flowers of benjamin.*			Benzoate of lime, &c.			
	Pyro-lignic radical.				Pyro-ligneous acid.	*Acid of wood.*			Pyro-lignite of potaſh, iron, &c.			
	Pyro-mucic radical.				Pyro-mucous acid.	*Spirit of honey, ſugar,* &c.			Pyro-mucite of magneſia. Ammoniacal pyro-mucite, &c.			
	Camphoric radical.				Camphoric acid.	*Acid of camphor.*			Camphorate of potaſh, &c.			
	Lactic radical.				Lactic acid.	*Acid of milk.*			Lactate of potaſh, &c.			
	Saccho-lactic radical.				Saccho-lactic acid.	*Acid of ſugar of milk.*			Saccholate of lime, &c.			
	Formic radical.				Formic acid.	*Acid of ants.*			Formate of ammonia, &c.			
	Pruſſic radical.				Pruſſic acid.	*Acid of Pruſſian blue.*			Pruſſiate of potaſh, of iron, &c.	*Pruſſian alkali.* *Pruſſian blue.*		
	Sebacic radical.				Sebacic acid.	*Acid of fat.*			Sebate of ſoda, of lime, &c.			
	Lithic radical.				Lithic acid.	*Acid of urinary calculus.*			Lithiate of ſoda, &c.			
	Bombic radical.				Bombic acid.	*Acid of ſilk worms.*			Bombiate of iron, &c.			

CHEMICAL NOMENCLATURE.

	SIMPLE BODIES		— RENDERED INTO GAS BY CALORIC.		— COMBINED WITH OXYGEN.		OXYDS WITH DIFFERENT BASES.		SIMPLE BODIES OXYGENATED WITH BASES.		— COMBINED, BUT NOT RENDERED ACID.	
	NEW NAMES.	FORMER NAMES.	*NEW NAMES.*	FORMER NAMES.	*NEW NAMES.*	FORMER NAMES.	*NEW NAMES.*	FORMER NAMES.	*NEW NAMES.*	FORMER NAMES.	*NEW NAMES.*	FORMER NAMES.
METALLIC SUBSTANCES.	Arſenic.	*Regulus of arſenic.*			Oxyd of arſenic. Arſenic acid.	*White arſenic.* *Arſenical acid.*	Sulphurated oxyd of arſenic, yellow and red. Arſenical oxyd of potaſh.	*Orpiment, Realgar.* *Liver of arſenic.*	Arſeniate of potaſh, &c.	*Arſenical ſalt of Macquer,* &c.	Alloy of arſenic and tin.	*Arſenicated tin.*
	Molybdena.	*Regulus of molybdena.*			Oxyd of molybdena. Molybdic acid.	*Calx of molybdena.*	Sulphuret of molybdena.	*Molybdena.*	Molybdate of potaſh, &c.		Alloy, &c.	
	Tungſten.	*Regulus of tungſten, Scheele.*			Oxyd of tungſten. Tungſtic acid.	*Yellow calx of tungſten.*			Tungſtate of lime, &c.		Alloy, &c.	
	Mangane ſe.	*Regulus of mangane ſe.*			Oxyds of mangane ſe of different colours.	*Calces of mangane ſe.*					Alloy of mangane ſe and iron.	
	Nickel.	*Regulus of nickel.*			Oxyd of nickel.	*Calx of nickel.*					Alloy of nickel and iron.	
	Cobalt.	*Regulus of cobalt.*			Oxyds of cobalt.	*Calces of cobalt.*	Alkaline cobaltic oxyds.	*Precipitates of cobalt rediſſolved by alkalies.*			Alloy, &c.	
	Biſmuth.	*Regulus of biſmuth.*			Oxyds of biſmuth, yellow and white.	*Yellow calx of, magiſtery of biſmuth.*	Sulphurated oxyd of biſmuth.	*Biſmuth precipitated by liver of ſulphur.*			Alloy, &c.	
	Antimony.	*Regulus of antimony.*			White oxyd of antimony by nitrous acid, by muriatic acid, by ſublimation, and by vitrification.	*Diaphoretic antimony,* *Powder of algaroth,* *Argentine flowers,* *Glaſs of antimony.*	Sulphurated oxyd of antimony.	*Kermes mineral,* *Golden ſulphur of antimony,* *Livers of antimony.*			Alloy, &c.	
	Zinc.	*Zinc, Spelter.*			Oxyd of zinc. Sublimed oxyd.	*Calx of zinc.* *Flowers of zinc.*	Sulphurated oxyd of zinc.	*Precipitate of zinc by liver of ſulphur.*			Alloy, &c.	
	Iron.				Oxyds of iron of different colours.	*Martial æthiops, colcothar,* &c.	Sulphurated oxyd of iron.				Alloy, &c.	
	Tin.				White oxyd of tin.	*Calx of tin.*	Yellow ſulphurated oxyd of tin.	*Aurum muſivum.*			Alloy, &c.	
	Lead.				Oxyds of lead.	*White lead, minium, litharge,* &c.	Sulphurated oxyd of lead.				Alloy, &c.	
	Copper.				Oxyds of copper, red, green, and blue.	*Calces of copper, red, green, and blue.*	Ammoniacal oxyd of copper.	*Cuprum ammoniacum.*			Alloy, &c.	
	Mercury.	*Quickſilver.*			Oxyds of mercury, black, yellow, and red.	*Æthiops per ſe.* *Turbith mineral.* *Calcined quickſilver.*	Sulphurated oxyd of mercury, black and red.	*Æthiops mineral,* *Cinnabar.*			Amalgams.	
	Silver.				Oxyd of ſilver.	*Calx of ſilver.*	Sulphurated oxyd of ſilver.					
	Gold.				Oxyd of gold.	*Calx of gold.*					Alloy, &c.	
	Platina.				Oxyd of Platina.	*Calx of platina.*					Alloy, &c.	
EARTHS.	Silica.	*Vitrifiable earth, quartz.*										
	Alumin.	*Argillaceous earth, clay.*										
	Baryt.	*Ponderous earth.*										
	Lime.	*Calcareous earth.*										
	Magneſia.	*Muriatic earth.*										
ALKALIS.	Potaſh.	*Vegetable alkali.*										
	Soda.	*Mineral alkali.*										

19
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